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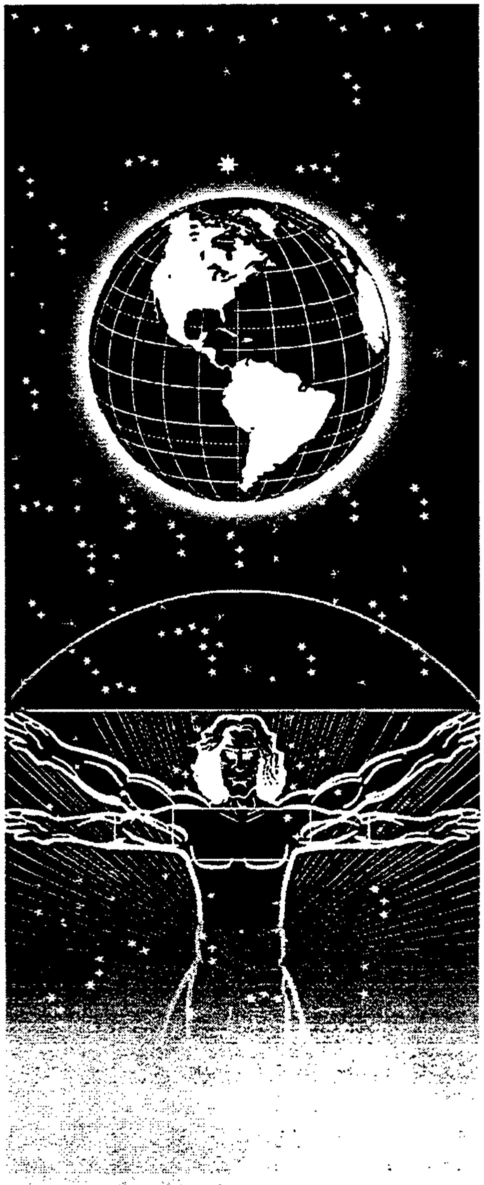

UNITED STATES AIR FORCE RESEARCH LABORATORY

ANALYSIS OF THE SPECIAL OPERATIONS FORCES NETWORK TRAINING FOR JOINT MISSION OPERATIONS SIMULATOR TRAINING

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The Office of Public Affairs has reviewed this report, and it is releasable to the National Technical Information Service, where it will be available to the general public, including foreign nationals.

This report has been reviewed and is approved for publication.

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13. ABSTRACT *(Maximum 200 words)*

The 58th Training Support Squadron (58 TRSS), Kirtland AFB NM, developed a high-fidelity Combat Mission Training (CMT) capability for its Annual Refresher Training (ART) curriculum. This program culminates in a multiple-aircraft training operation involving five on-site networked aircrew training devices: the MC-130P Combat Shadow Weapons Systems Trainer (WST) and Satellite Navigation System (SNS), the MH-53J Pave Low WST, the TH-53A Operational Flight Trainer (OFT), the MH-60G Pave Hawk WST, and the HH-60G OFT. The networked combination of these realistic training devices, coupled with high-fidelity geospecific databases, has enabled a unique Special Operations Force Network (SOFNET) training capability that combines dissimilar training devices in real time on a common Area of Operation. The simulators are linked via a central Intersimulator Network (ISN) that permits interactivity and shared viewing among the WSTs and OFTs. Importantly, the SOFNET/ISN creates a true shared mission rehearsal (MR) and training capability since multiple aircraft (crews) can plan, prepare, and execute a joint mission. In this report, we summarize the results of a preliminary investigative project to document multiple crew training methods, and crew reactions to SOFNET training. We describe how the TRSS's ART has evolved as a training program; then we present a conceptual model that serves as the basis for illustrating the SOFNET environment from three perspective levels: Training Devices, Scenario Command and Control, and Mission Elements. In addition, we describe the methods of the research, including the research participants, data collection instruments, data collection procedures and techniques, and the resultant data structure. Following this, survey results are presented. We conclude this report by discussing implications for administering CMT within the TRSS, and the need for conducting further applied effectiveness and transfer of training research.

14. SUBJECT TERMS

Aircrews; Annual Refresher Training; ART; CMT; Combat mission; Combat Mission Training; Flight simulation; Flight simulators; Mission Rehearsal; MR; Networking; SOF; SOFNET; Special Operations Forces; Training devices

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PREFACE

This report was performed for the Warfighter Training Research Division of the Air Force Research Laboratory (formerly known as the Aircrew Training Research Division of Armstrong Laboratory, Human Resources Directorate (AL/HRA) by Hughes Training, Inc. (HTI) - Training Operations, and Anacapa Sciences, Inc. HTI has a two-year contract (Contract F41624-95-C-5011) with AL/HRA to provide behavioral research support in the areas of combat mission training and mission rehearsal. Anacapa Science, Inc. serves as a subcontractor to HTI on this effort, providing scientific and technical support. The contract effort was conducted under Work Unit 1123-B2-06, Aircrew Training Research Support. The Laboratory Contract Monitor was Mr Daniel H. Mudd; the laboratory technical monitor was Dr Robert T. Nullmeyer.

The authors would like to acknowledge several individuals who contributed generously of their time and support to this report. We would first like to thank LTC Reed who was the commander of the 58th Training Support Squadron (58 TRSS) throughout much of the duration of this project. He provided us access to the people and the state-of-the-art technology associated with the 58 TRSS. We would also like to acknowledge Mr John H. Fuller, Jr., HTI's program manager, for his guidance and encouragement throughout this effort. We would especially like to thank the HTI Annual Refresher Training Instructors at Kirtland Air Force Base and the Special Operations Forces (SOF) participating aircrews, whose cooperation and input made this research possible.

ANALYSIS OF THE SPECIAL OPERATIONS FORCES NETWORK TRAINING FOR JOINT MISSION OPERATIONS SIMULATOR TRAINING

INTRODUCTION

The 58th Training Support Squadron (TRSS) at Kirtland AFB, NM, developed a high-fidelity Combat Mission Training (CMT) capability for its Annual Refresher Training (ART) curriculum. This program culminates in a multiple-aircraft training operation involving five on-site networked aircrew training devices: the MC-130P Combat Shadow Weapons Systems Trainer (WST) and Satellite Navigation System (SNS), the MH-53J Pave Low WST, the TH-53A Operational Flight Trainer (OFT), the MH-60G Pave Hawk WST, and the HH-60G OFT. These devices provide high-fidelity simulations of aircraft and environmental simulations. These simulations include the Digital Radar Landmass System (DRLMS), Infrared Detection Systems (IDS), Night Vision Devices (NVDs), and Integrated Electronic Combat Simulation System (IECSS); and fully correlated image generator (IG) display systems.

This *networked* combination of realistic training devices, coupled with high-fidelity geospecific databases, has enabled a Special Operations Force (SOF) Network (SOFNET) training capability that combines dissimilar training devices in real time on a common Area of Operation (AO). A fiber-optic, reflective, memory-based network links these simulators. This central Intersimulator Network (ISN) permits real-time interactivity through the AO. The ISN treats each non-ownship simulator on the network as a moving model. This feature allows the Training Observation Center (TOC) and the Audio Visual Recording Studio (AVRS) to be linked to the ISN, rather than to each simulator individually, which provides an efficient means to view all the simulators at once. Importantly, the SOFNET/ISN creates a true, shared mission rehearsal (MR) and training capability since multiple aircraft (crews) can plan, prepare, and execute a joint mission.

While these advancements hold great potential for training applications, little is known about how training has been affected since networked simulation methods have been integrated into the curriculum. This report summarizes the results of a preliminary investigative project whose purpose was to document multiple crew training methods, and crew reactions to SOFNET training.

This report is presented in sections. In the first section, we describe how the TRSS's ART has evolved as a training program. Following this, we provide a conceptual model that serves as the basis for illustrating the SOFNET environment from three perspective levels: Training Devices, Scenario Command and Control, and Mission Elements. The third section describes the methods of the research, including the research participants, data collection instruments, data collection procedures and techniques, and the resultant data structure. This section also discusses both the empirical data and descriptive comment data collected from subjects who participated in the research. Finally, this report concludes by discussing implications for administering CMT within the TRSS, and the need for conducting further applied effectiveness and transfer of training research.

TRAINING PROGRAM EVOLUTION

The ART conducted by the TRSS is a high-priority training requirement for SOF mission-qualified aircrew members. The appropriate Air Force and command directives specify the content of this training--the training matter may be assumed to be a relative constant as aircraft systems and procedures do not change regularly. The ART curriculum at Kirtland, however, has undergone major shifts with regard to both the manner and matter of training in recent years.

Refresher training consisted generally of academic classroom sessions covering aircraft-specific systems and emergency procedures reviews. Following each half-day classroom session, crewmembers were then required to apply these lesson topics, in a partial-task training approach, in their aircraft-specific simulator. This modular training method worked well for many years, and those AF units using this system were, for the most part, satisfied with the training provided. There was, however, a growing consensus in the relatively small SOF community that the expense of bringing crews to Kirtland each year for a repeat of the same anticlimactic curriculum was becoming prohibitive. The leadership at Kirtland responded by incorporating the network simulation capability to the ART curriculum.

The result has been a very noticeable shift in training philosophy from aircraft systems malfunction training for individual crewmembers to a combat mission training orientation for full mission teams. Systems training was not deleted in this new training philosophy; rather, systems malfunctions were now required to be exercised in real-time in the complex combat mission environment. ART crews performed their corrective actions to instructor-induced systems malfunctions and emergency procedures while other combat stressors (e.g., threats) also inflicted a toll on the mission team's actions.

Coincident with the shift in training philosophy, the aircrew training devices and host computers were undergoing significant upgrades. The resultant increases in simulation fidelity have afforded new and unique approaches to training that had not been previously possible. With the integration of electronic warfare systems, countermeasures, improved visual systems and correlated sensors, crews could now perform real-world joint operations missions in a simulated environment. The combination of improved simulation technologies, a vision for implementation of distributed interactive simulation (DIS) methods, and a customer thrust for a mission-specific and joint operations training curriculum, led the TRSS to implement SOFNET training.

RESEARCH ENVIRONMENT

This evolution of networked simulation technologies at the 58 TRSS is providing training environments that more closely resemble multiship operations that graduates will likely encounter. There is a longstanding belief that performance of combat aviators in combat environments can be enhanced through large group training. Red Flag and Joint Readiness and Training (JRT) exercises are two examples of live training that allow crews to experience flight operations at a more tactically realistic scale than is possible during routine squadron training flights.

Unfortunately, live training at this level occurs infrequently and shrinking military training budgets are adding pressure to reduce the frequency of live exercises even more. In response, there is widespread interest throughout the Department of Defense in the ability of networked simulation to increase the scope and realism of warfighter training. Technologies similar in function to the 58th Special Operations Wing (SOW) SOFNET are being developed within both research and training communities to provide synthetic environments that enable warriors to train as members of larger tactical teams.

In addition to expected cost savings, a simulated combat environment provides special instructional advantages that are not found on ranges which have a variety of training constraints. For example, range training restricts the electronic warfare aspects of the battle due to security considerations, while simulator training allows for a complete range of electronic warfare tactics to be conducted.

The value of these technologies will obviously depend upon how they are used. The Warfighter Training Research Division of the Air Force Research Laboratory (AFRL/HEA) established a research program to develop guidelines that will allow instructors and trainees to take maximum advantage of synthetic multiship environments (Carroll & Andrews, 1996). Goals of this research include identifying skills and knowledge that should be trained using multiship simulation, exploring novel training interventions made possible by synthetic environments, and determining how such training should be evaluated.

In support of AFRL/HEA's "Training the Warfighter" research program, we documented lessons learned and crew reactions to the integration of SOFNET into the ART syllabus of instruction. This allowed an early look at networked simulation in the context of an Air Force mission training school.

In this initial application, Day 4 of ART was dedicated to SOFNET training. A mission tasking was provided to the crews in an 0800 briefing. The remainder of the morning was available for mission planning. The mission plan was briefed mid-day and executed in the afternoon. The simulator session was usually completed about 1700 at which time a crew debrief and an instructor "hot wash" occurred. The people being trained were mission-ready MC-130P, MH-53J, or MH-60G crews from operational units around the world who were receiving ART at Kirtland AFB. As a result, crewmember reactions provide feedback from front-line warriors concerning the desirability and value of multiship simulator training as part of the ART experience.

SOFNET TRAINING ENVIRONMENT

The SOFNET training environment may be envisioned, for the organization purposes of this report, as the notional intersection of three modularized components: Training Devices, Scenario Command & Control, and Mission Elements (Figure 1).

Training Devices

The first component may be defined for our purpose as the composition of participant crews who are represented as "players" in their respective networked training device(s). This critical component may be comprised of any combination of network participants, and the training scenario and environment is manipulated based upon the matrix of participants scheduled for the training. As discussed in the following sections, current participant capability may include any combination of crews in the following training devices: the MC-130P Combat Shadow WST and SNS, the MH-53J Pave Low WST, the TH-53A OFT, the MH-60G Pave Hawk WST, and the HH-60G OFT. We anticipate additional participants to be added to the network with the Aerial Gunner/Scanner Simulator (AGSS) expected in 1997 (Silverman, Spiker, & Nullmeyer, 1996).

To further illustrate, one training scenario may have MC-130P, MH-60G, and MH-53J participant crews flying the MC-130P WST/SNS, the MH-60G WST, and the MH-53J WST respectively, with an instructor crew tasked to fly the TH-53A OFT in an aggressor mode. This combination of participant crews dictates one specific direction that the training scenario may take and a particular set of mission variables or outcome parameters that might be considered

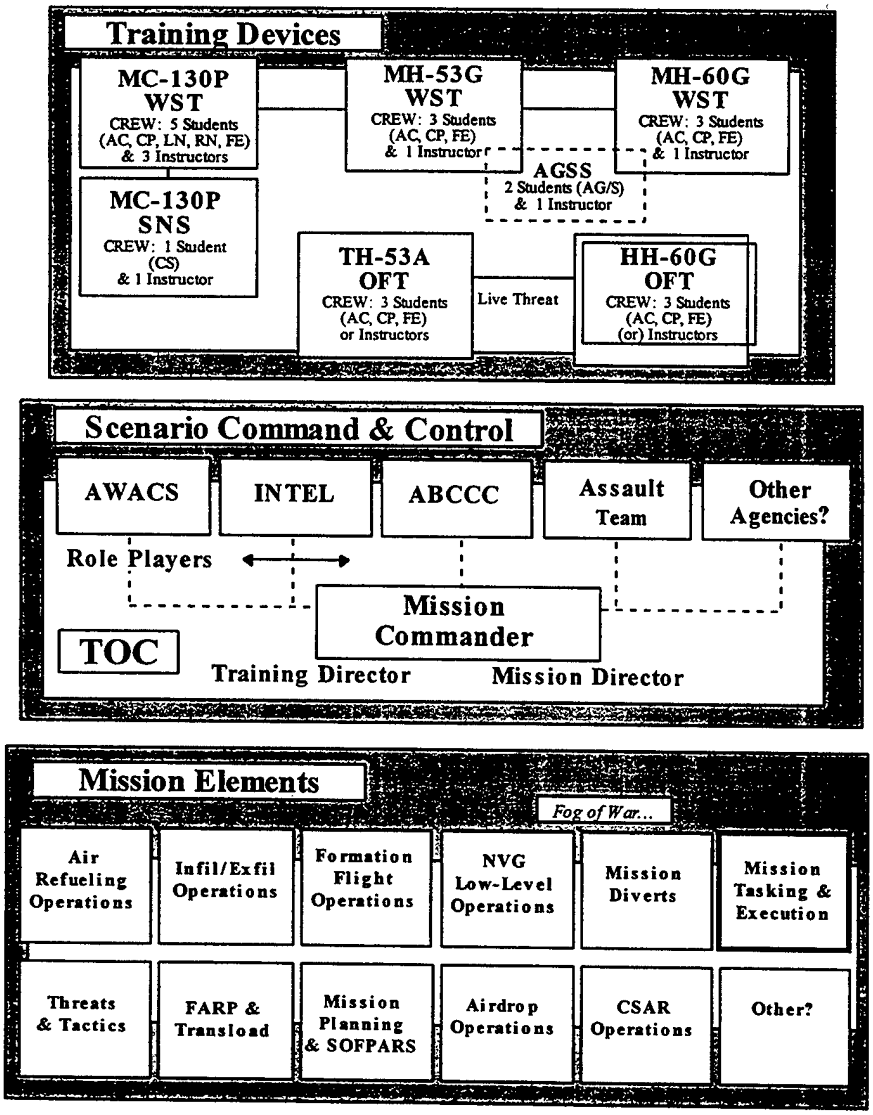

Figure 1. SOFNET Environment

acceptable must be established for this scenario. It is reasonable to assume that the potential for different mission outcomes in the SOFNET training session is a direct function of the number and composition of participant crews, as described below.

MC-130P

MC-130P participant crews perform their simulated mission operations in the MC-130P WST. This device is a six-degree-of-freedom, high-fidelity weapons systems trainer based on the crew and systems configurations of the MC-130P Combat Shadow aircraft. This device uses, among others, a CompuScene V image generator system, a fully correlated IDS, a DRLMS, navigation systems, and out-the-window (OTW) displays. Simulated navigation systems include Doppler, inertial navigation system (INS), control display units, and a central computer system that integrates various flight systems.

The MC-130P WST is currently configured to match the Special Operations Forces Improvements (SOFI) version of the MC-130P aircraft, while the SNS is configured after the HC-130P cockpit configuration, both currently being flown by Air Force Special Operations Command (AFSOC) units. When manned by participant crews from these units, the MC-130P aircrew consists of an Aircraft Commander (AC), Copilot (CP), Left and Right Navigators (LN, RN), Flight Engineer (FE), and Communications Specialist (CS). Both pilots and navigators, and the FE normally perform their mission duties in the WST, while CSs perform their duties in the SNS. These participants are mission qualified and trained to handle special mission tasking that may incorporate several mission events such as NVD low-level operations, aerial refueling, airdrop, and infil/exfil operations.

Closely linked to the WST, the SNS is a part-task trainer used to independently train HC-130P navigators (NAVs) and CS crewmembers. This device may operate in an independent mode or in an integrated mode. When in independent mode, the device operates independent of any other device and is used to train only the Nav and/or the CS in crew-position specific tasks. This device might be used, for example, for the NAV's procedures-oriented, overwater, celestial navigation practice, or for the CS's secure communications practice. When in this mode, the SNS instructor must assign the DRLMS radar system display to either the WST or the SNS. Once assigned, the alternative device will not have a radar display for training.

When in integrated mode, however, the SNS operates in conjunction with the WST. The Nav may be trained from either the WST or SNS location in this configuration, while the CS remains located in the SNS for orchestrated training with the crew in the WST. This is the configuration that is typically used when, for example, a full MC-130P crew is tasked to conduct mission operations training. The pilots, navigators, and flight engineer are located in the WST, and the CS is located in the SNS. This is just like the SOFI aircraft where the CS station is geographically separated—i.e., located in the cabin compartment to the rear of the flight deck.

Other participant crews who fly only the HC-130P may also attend ART, but they are required to fly the MC-130P WST. When this is the case, the crew composition is the same as listed above with the sole exception that there is only one navigator present. This Nav does not fly in the WST as the navigator station does not represent the same configuration as the HC-130P. Instead, this navigator performs duties in the remote SNS, which is configured to match the HC-130P aircraft, and is operated in the integrated mode with the WST.

MH-53J

MH-53J pilots and flight engineers perform their simulated mission script in the MH-53J WST. This device is a six-degree-of-freedom, high-fidelity weapons systems trainer based on the crew and systems configuration of the MH-53J Pave Low helicopter. This device uses a CompuScene V image generator system; fully correlated, Forward Looking Infrared Radar (FLIR), radar, navigation systems, and out-the-window displays. Navigation systems include a Global Positioning System (GPS), Doppler, INS, control display units, and a central avionics computer system that integrates the various flight systems.

The MH-53J WST is currently configured to match the same aircraft and to support AC, CP, and FE participants from several AFSOC squadrons. These participant crews are mission qualified and trained to conduct, for example, insertion and extraction operations, combat search and rescue operations, gunship escort, and shipboard operations. Air Combat Command (ACC) units who fly the HH-53B/C/H helicopter may also attend ART. Although the WST is not an exact replication of their aircraft, these participants are required to perform their duties in the MH-53J WST and are asked to simply understand and work around those differences between the WST and their own aircraft configurations.

MH-60G

MH-60G ACs, CPs, and FEs perform their simulated mission script in the MH-60G WST. This device is also a six-degree-of-freedom, high-fidelity weapons systems trainer based on the crew and systems configuration of the MH-60G Pave Hawk helicopter. Like the MH-53J, the MH-60G WST uses an 8-channel, fully correlated, CompuScene V image generator for both OTW and FLIR. Additionally, this device uses DRLMS for multimode radar, and contains a fully replicated cockpit with all tactical and conventional avionics systems either simulated or stimulated.

The MH-60G WST is also configured to match the same aircraft and designed to support mission training of participant crews from AFSOC. ACC and Air Force Reserve (AFRES) crews also fly the HH-60 helicopter and may also attend ART. Although the WST is not an exact replication of their aircraft, these participant crews may still perform their duties in the MH-60G WST, or the HH-60G OFT (described below). Again, like the MH-53J, participant crews are asked to understand and work around those differences between the WST and their own aircraft configurations.

TH-53A OFT

Participant crews may also perform their simulated mission script in the TH-53A OFT. This device is a six-degree-of-freedom, high-fidelity simulator based on the crew and systems configuration of the TH-53A helicopter and designed to support mission training of AC, CP, and FE participant crews. It is a modification of an H-53 simulator and uses a CompuScene V visual system to provide a photo-specific training environment. The TH-53A OFT is typically used as a part-task trainer (PTT) to train participant crews in basic contact, emergency procedure, instrument, and initial day and night tactical (including NVD) operations. All cockpit switches and instruments in this device are functional, where required, to support these training tasks. When in the network mode, however, the TH-53A OFT functions as an aggressor attack helicopter allowing advanced air combat training to be conducted.

HH-60G

Participant crews may also be required to perform their simulated mission script in the HH-60G OFT. This device is a non-motion device used to augment the mission training capabilities of the MH-60G WST and designed to support mission training of AC, CP, and FE participant crews. This device features a "cross-view" wide display system and a six-channel, PT-200 image generator, allowing day, dusk, night, and NVD flight operations in highly realistic database AOs. A replicated crew and systems cockpit includes operational radar, FLIR, and navigation systems. Seat shakers and a digital audio system help to prevent simulator-induced motion sickness, and provides realism for basic and combat training tasks including low-level flight and shipboard operations.

AGSS

Finally, gunners and scanners will perform their mission operations in the Aerial Gunner/Scanner Simulator, once it becomes networked (currently scheduled for late 1997). This device is a three-degree-of-freedom (pitch, roll, and heave), ground-based trainer that is designed to provide both basic skills and mission rehearsal weapons training for aerial gunner (AG), FE, and/or pararescue personnel. The AGSS is a reconfigurable (MH-53J and MH-60G) device, capable of simultaneously training as many as three gunners/scanners using virtual reality visual system display technology, and computer-scoring of air-to-air or air-to-ground gunnery performance against fixed or moving targets. The main components of the visual system are three helmet-mounted displays, three head-tracker systems (which generate information based on

head position and attitude for the image generation system on each gunner), and an image generator. The AGSS is designed to operate as a standalone trainer (AGSS only), an integrated crew trainer (AGSS with a host cockpit--either the MH-53J WST or the MH-60G WST), or networked (AGSS with a host and multiple training devices).

Scenario Command and Control

Scenario Command and Control is represented by players who are scripted into the particular combat mission training scenario. Role players represent, for example, the Airborne Command and Control Center (ABCCC), the Airborne Warning and Control Center (AWACS), a ground assault team commander, a simulated transload aircraft at a forward Landing Zone (LZ), intelligence (INTEL), etc. The Training Director (TD) or Mission Director (MD) weave these simulated operations elements into a cohesive execution of the mission elements.

These individual entities, when represented by live role players, are physically located in the Training Observation Center (TOC), and fall under the control and discretion of the TD or MD. They are tasked to follow the fluid mission script, when able, as the training scenario develops, and intervene as necessary to steer the mission to its intended training conclusion. These live players must understand and control the limitations and/or capabilities of SOFNET/INS and each of its associated training devices. They work to integrate all SOFNET components and provide the necessary command and control (C2) necessary to support the training objectives.

For example, mission participants may be reacting to dynamic training conditions in a manner that was not originally intended. In order to get these participants on the correct track, they might be "steered" to a successful outcome. To illustrate, a helicopter crew might have failed to push a frequency change after inserting a ground assault team into an unsecured drop zone (DZ). Consequently, the ground team commander would be unable to call for fire support, and the mission objective would be in dire jeopardy. The MD, recognizing a need to intervene before the mission comes to an abrupt and unsuccessful conclusion, could task the ABCCC role player to inform the helicopter crew of the ground team's attempts to make contact in accordance with the Communications Execution Operating Instructions (CEOI). In this manner, the scripted mission would remain fluid without direct instructor intervention to correct a faulty course of action, and the crew can be steered to a successful mission outcome.

Training Observation Center

The TOC is the an multimedia auditorium and electronic classroom where the MD/TD and role players are centrally located to guide and/or manage the simulation. This facility is specifically used as a secure simulator scenario and network control center. As the locus for the SOFNET intersimulator network, up to six role-player stations with communications capability to each of the simulators is used, and either a Training Director or a Mission Director position is used to control all activities in the TOC. The TOC contains a simulator display system with eight 35" monitor displays and two 60" displays. Each of the 35" monitors may be linked to any simulator on the net, and the TD/MD selects any combination of screens for display of out-the-window visuals that are currently being viewed in a particular simulator. Additionally, a 60" monitor is used to display the projected scenario map (i.e., the "Fulcrum," as described below), which can be stepped through various scale sizes. This feature permits the TD/MD and role-players to monitor the development of a particular scripted mission scenario or exercise.

The Fulcrum is a map-based, mission-tracking capability that allows the use of VideoDisk- or CD-ROM-based mission maps. The Fulcrum situational display is automatically fed certain mission-relevant overlay data extracted from the SOFNET control computers. This extracted data consists of pertinent model, position, and support information from each player on

map resolution and geographic region of interest. The Fulcrum filters the overlay data based on the user's selections, and displays icons in the area being viewed (representing ownships, moving models, and threats). Each TOC operator may then view the Fulcrum at their own control station in the networked mode, which allows the use of a single VideoDisk or CD-ROM drive to provide map sources, while at the same time allowing each user to view the overall mission tailored to their specific interests.

The TOC has several user-interface stations that are used to provide a role-playing capability for interactive communications during the multiship SOFNET mission training sessions. Each user/role player station is comprised of a PC-platform, MicroSoft Windows-based interface for configuring the user's communications selections and accessing the Fulcrum situation display system. The user's intercom allows selection of any UHF, HF, or FM radio and frequency combination. The actual radio communications operate in much the same manner as in the real world, in that the user may be connected to any other TOC user and/or simulator crew position on the SOFNET, based on radio/frequency matching. In addition to these three radio channels, each TOC user has a configurable instructor channel that allows private communications with a single simulator instructor or a common connection to all instructors.

Audio-Visual Recording Studio

The Audio-Visual Recording Studio (AVRS) is a commercial-quality television recording studio that may be interfaced directly with the simulators. The AVRS can record the OTW scene, the sensor displays, and the radar/missile warning displays. Both secure and non-secure (open) communications between simulators may be recorded, at the MD/TD's discretion, and low-light cockpit cameras and VCRs record all crew activities and intercom audio. Additionally, the AVRS video can be displayed on all of the TOC's eight monitors, or the Fulcrum system.

Integrated Electronic Combat Simulation System

The IECSS provides a full electronic warfare (EW) simulation capability for the MH-53J Pave Low, MH-60G Pave Hawk, and MC-130P Combat Shadow WSTs. The IECSS is used to realistically simulate (a) the electromagnetic and infrared EW environment; (b) threat weapons dynamics and engagement including command, control, and communications (C3) characteristics; (c) EW defensive systems processing and environment interactions; (d) countermeasures effectiveness calculations; and (e) EW systems audio and video interface to the aircrew. The fidelity level of the IECSS simulation is sufficient to support MR for qualified aircrews in addition to programmed, repeatable training to qualify or upgrade new aircrew members.

Mission Elements

Finally, the Mission Elements component may be envisioned as the particular mission objectives that may be accomplished depending upon the skill and/or capability of the participants, or the C2 mission assignments in accordance with the frag's tasking, or the development of the mission scenario as the script plays out in real-time execution. The C2 element may view this component as the "toolbox" of events that may be performed by a particular combination of participants in the network training. Specifically, the SOFNET training session may be comprised of any combination of aircrew participants with differing mission requirements and capabilities. The "toolbox" of mission elements that would emerge as possible joint training objectives might include, for example, aerial refueling, formation flight, threats and tactics, etc. Upon consideration of the matrix of available participants, the MD might consider tasking a different set of mission objectives for a particular training session.

To illustrate, the SOFNET training actually begins the day prior to mission execution. Crewmembers are provided with weapons system-specific mission packets that outline the mission tasking details in a form that resembles a typical mission "frag" (that has been extracted from a contingency operation's Air Tasking Order). The packets are provided in advance so that crewmembers may familiarize themselves with the mission's details and specific mission element tasking at their own convenience. Information is provided that allows the crews to relate to the general scenario, the specific mission objectives and order of mission elements, operational weather conditions and forecasts, etc. Additionally, information is provided that details preplanned Selected Areas For Evasion (SAFE), air and ground order of battle, and both communications and mission execution checklists. This information is designed to provide the participants with a macro-level familiarization of the mission objectives prior to the actual mission brief. Finally, participants are provided with a comprehensive package of specific planning details regarding each of the mission elements (for example, the air refueling operation, and/or threat locations, etc.).

Mission Tasking

The scripted training mission is conducted in the Southwest USA ("SWUSA") database, and entails a high-level mission authorization and Warning Order to conduct POW rescue operations in hostile territory. The mission scenario includes forced entry into a POW compound to return coalition force detainees to friendly control. After recovery has been completed, the assault force will transport recoverees and a medical team to an abandoned airfield for transload and evacuation. All participant forces are also tasked to be prepared to pickup downed crewmembers, as required.

This mission tasking entails a complex set of mission elements that may be performed by participant crews. Specifically, the MC-130P WST/SNS will conduct NVG low-level operations to a precoordinated Air Refueling Control Point (ARCP), and provide refueling support for a helicopter formation (MH-53J and MH-60G) prior to their crossing into hostile enemy territory. After the refueling operation is complete, the MC-130P will continue its NVD, low-level operations to perform an airdrop of a reconnaissance-reception team at a transload airfield. This site is to be used by the helicopter formation, and others, to conduct blacked-out Infil landing operations, and transfer of personnel to a waiting (simulated visual model) MC-130H Talon aircraft.

Next, the MH-53J WST will fly an NVD, low-level route as formation lead with the MH-60G. They will fly to the preplanned air refueling point, conduct refueling operations with the MC-130P, and cross the fence into deep hostile territory. This territory has a medium-level threat saturation, and formation tactics and altitudes will be flown appropriate to the environment. After the refueling, the objective is to fly to the hostile POW compound and insert a special forces team via fastrope procedures. This team will secure the compound, with helicopter air cover and fire support, and extract the friendlies back onto the helicopters. Following this, the helicopters will fly to the transload site for transfer and evacuation of the expatriated POWs.

The MH-60G WST will also fly low-level, as formation wingman to the MH-53J. They will also fly to the preplanned air refueling point, conduct refueling operations with the MC-130P, and cross the fence into hostile territory. The objective will be to assist the MH-53J with the insertion of a special forces team via fastrope procedures into a POW compound. This team will secure the compound, with helicopter cover and fire support, and extract friendly forces back onto the helicopters. Following this, both helicopters will fly to the transload site for transfer and evacuation of the expatriated POWs.

Finally, either the TH-53A or the HH-60G OFT will be represented in the visual model set as a threat helicopter (Hind) who has located a precoordinated attack point. For this mission's purpose, one of these devices will be used to conduct live aggressor tactics and is manned by two instructor pilots and one instructor flight engineer/simulator operator. Their objective is to perform multiple attack runs on the helicopter formation and attempt to divert them from their primary mission tasking.

METHOD

This section describes methods and procedures we used to conduct the research. The first subsection describes sessions observed and participant crews from whom data were collected. The second subsection covers design of the present effort where we discuss the logistic features considered essential to apply a naturalistic, observational approach. Next, we discuss the survey instrument used to collect empirical data from participant crewmembers. In the final subsection, we discuss the procedural steps that we followed in collecting the observation and survey data.

Participants

Data were collected from 11 SOFNET training sessions, encompassing 99 AFSOC and ACC crewmember participants (enlisted and officer), conducted between 13 Jun 96 and 24 Oct 96 (see Table 1). These volunteer subjects represented a mix of AC, NAV, FE, and CS crew positions for the MC-130P, MH-53J, HH-53, MH-60G, and HH-60 aircraft (see Table 2). Observation and comment data were collected primarily from a position located in the TOC, where direct crewmember performance and mission development feedback could be received from the monitor displays, or from MD and/or role player personnel remarks. Additionally, portions of each participant crew's mission preparation and mission briefing periods were observed. These observations were performed in the respective participant crew's mission planning rooms, which presented opportunities to openly discuss with each crewmember and instructors alike, those concerns associated with networked mission training for operational requirements.

Table 1. **SOFNET Sessions - Participant Data**

Date	MC-130P WST	MH-53J WST	MH-60G WST	TH-53A OFT	HH-60G OFT	Number** of participant crewmembers	Number of Instructors & support personnel
1. 6/13/96	X	X	X	Threat*		13**	9/4 (13)
2. 7/11/96	X	X		Threat*		10	8/4 (12)
3. 7/18/96	X	X	X	Threat*		11	9/4 (13)
4. 7/25/96		X	X	Threat*		7	5/4 (9)
5. 8/15/96	X	X	X	Threat*		14	9/4 (13)
6. 8/22/96	X	X	X	Threat*		13	9/4 (13)
7. 8/29/96	X*	X	X	Threat*		7	13/3 (16)
8. 9/19/96	X	X		Threat*		12	8/4 (12)
9. 10/3/96	X*		X	Threat*		4	12/3 (15)
10. 10/10/96	X	X	X	Threat*	X	17	10/4 (14)
11. 10/24/96	X	X	X	Threat*	X*	10	12/4 (14)

* Flown by Instructor Crews
** No surveys collected

Table 2. **Subjects by Crew Position and Weapons System**

	AC	CP	FE	NAV	CS
MC-130P	7	7	6	11	6
MH-53J	12	10	16		
MH-60G	7	7	9		
Total	26	24	31	11	6

Procedures

Observations

The researcher's primary responsibility in this project was to identify, from instructors, role players, crewmembers, and training support personnel, those key issues, achievements, or performances that are distinctive of the SOFNET training method. A naturalistic observation technique was chosen as the first approach to collect data related to the conduct and quality of the SOFNET training sessions, and the manner, matter, and perceived outcomes of the training. This approach was determined to be acceptable for this project's investigative purpose as the primary researcher possesses extensive subject-matter expertise; an intimate understanding of current TRSS training doctrine; and extensive flight, training, and simulation experience in joint mission operations. Additionally, this approach allowed us to capitalize on the on-going ART, and provided us with access to a highly experienced, volunteer subject pool

Survey

A second approach to data collection was to capture participant crewmember critiques regarding the relative value and utility of SOFNET training. This was done through the use of a questionnaire. The researcher's primary role for this purpose was administrative in nature, however, many participants also offered commentary statements while completing their surveys, as a result of insights, and recalled from the survey questions. These comments or issues were discussed with other participant crewmembers and the primary researcher in an open forum manner, and were recorded along with the observation notes for later analysis and presentation.

The SOFNET Training Survey is a self-report tool that is divided into three sections (see Appendix A). The first section captures relevant background information from each crewmember (e.g., crew position, flight experience, etc.), such that a descriptive profile of each crewmember's basis of experience may be established. The second section asks respondents to answer, in narrative form, questions related to their experience with the network mission. Following this, section three asked for (1: Low to 5: High, or NA: Not Applicable) ratings and comments on the value of networked simulation relative to standalone simulation, across each of 33 mission elements. Additionally, a last item asked respondents to rate the "overall value" of networked simulation. The purpose of section three was to establish, from those participant-experts, a quantitative scale that demonstrates "where" and "how" networked simulation has definite advantage over standalone simulation training methods.

Design

During critical phases of the SOFNET training (i.e., mission in-brief, mission execution, and debrief), observation data were recorded by an SME-researcher from an intercom/control station in the TOC, located immediately adjacent to the MD. From this vantage point, our SME-researcher was able to make informed observations and assessments based on personal knowledge and expertise. Additionally, observations of interactions between the MD, role players, and support personnel (e.g., engineering, etc.) could be made, as well as providing opportunities to request rationale or clarification on important issues, as necessary.

Following mission execution, participant crews and instructors would next meet in the TOC for a "mass debrief." While this period rarely provided any consequential content regarding academic or procedural performance, the discussions that followed were fertile ground for the primary researcher to record noteworthy and free-flowing instructor and participant-crewmember comments related to joint training and simulation methods.

Following the mass debrief, instructors released participant crews to report to the SME-researcher in an adjacent room. The purpose was to briefly describe, in private and without instructors present, the research project and focus, the purpose of the information being collected, and the researcher's role in collecting information. The surveys were then distributed, and the SME-researcher remained available for questions or explanation until all SOFNET Distributed Mission Training Surveys were completed. This period generally lasted no more than 30 minutes, although on at least three occasions, several crewmembers remained for a lengthy discussion with the SME-researcher on the concept and methods of networked simulation.

RESULTS

Observations

The following sections present a summary of those observations made during the conduct of SOFNET training. Several SOFNET issues are discussed with respect to their particular strengths, weaknesses, observations, and/or techniques. First, several observations regarding the participants are described. Then, following the logic of the SOFNET environment (Fig. 1), issues are outlined into three sections: Training Devices, Scenario Command and Control, and Mission Elements.

Participant Crews

Crews are scheduled for a 10+ hour training day. The SOFNET training day begins at 0730, and barring any unforeseen delays, is not scheduled to end until 1830. While the length of the training day has not been an issue, there are implications that should be addressed. First, instructors are not demonstrating a motivation to spend this much time and effort on a single training mission. They feel they are being "over-tasked" for a demonstration purpose only. And, second, participant-crewmembers have questioned if their own performance can be expected to improve by using this level of high-intensity training for such a long period of time.

Crew's mission tasking requirements present differences in accordance with major command (MAJCOM) procedures. Currently, the SOFNET training scenario, which is oriented toward a typical AFSOC mission tasking, is conducted regardless of the complement of participant crews in attendance at ART. Very often, dissimilar command crews are represented in each of the helicopter cockpits. For example, the MH-60G WST may have an ACC crew qualified in the HH-60G only, and unqualified in AFSOC missions. Crews have suggested that this presents a dilemma to them in terms of how to perform the mission tasking, and how to deal with differing aircraft capabilities, MAJCOM procedures, etc.

Inadequate or incorrect information provided for mission planning. Crewmembers report that they often experience information deficiencies in mission frags for training, or the information is inadequate for certain crewmembers to break out specific details necessary to perform their individual jobs. Additionally, some mission events were reported as being somewhat unrealistic. For example, crews reported that reasonable tasking for MC-130P tankers is not likely to include extended orbits in (any) threat environment while waiting for receiver helicopters. Thus, there is little perceived value to artificially establishing this mission requirement. Tanker crews do, however, regularly practice for threat environments, and they plan their air refueling operations using precise low-level timing to the ARCP. It was suggested that current real-world, Air Tasking Orders (ATOs) generally provide for at least one alternate mission tasking in the event that the primary mission scrubs. Finally, some crewmembers remarked that their specific roles as network players in the mission script was not as clear as they would have preferred. They felt this was likely due to the limited time to examine, question, and prepare individual mission execution plans.

Differences in crewmember motivation for SOFNET training. Participant crews tended to be either fully opposed to, or in support of, the current network training methodology. The opposition perspective, albeit proposed from a very small percentage of the participants, was best represented by three senior-ranking MC-130P crewmembers who hold key leadership positions at their respective group level. These individuals attended the ART, and indicated resentment in being required to sacrifice a critical, full day of their regular classroom and simulator emergency procedures training in order to participate in the network simulation mission. In the absence of comprehensive training objectives that explain the value of network training, these crew-members' perception was that their training time is otherwise being drained by participating in essentially ". . .the [same] mission training that we do everyday!" A surprisingly supportive perspective, however, was reported by two (ACC) MH-60G crews. The perspective of these crews is that the network combat mission training provides an unusual opportunity for exposure to the SOF mission. These crews are typically tasked to fly and train for Combat Search and Rescue (CSAR), and they would otherwise not be exposed to the dynamics or tasking of SOF missions. At least one MH-60G crewmember expressed that the SOF MH-60Gs represent only about 10% of the fleet, and the likelihood of exposure to these missions in real time is remote. Although the scenario script is not directly applicable to (ACC) MH-60G training requirements, these crewmembers reported that this orientation adds incremental value to using a networked training methodology.

Training Devices

Performing mission operations in a fictitious database Area of Operation (AO). The mission scenario is currently scripted in an unclassified database using a fictitious country setting with made-up names. At the experienced crewmember and ART level, there appears to exist little perceived value to promoting simulated mission operations in such an artificial manner. Participant crewmembers report that using fictional names makes the scenario more difficult to remember, or relate to any personally held "mental model" of the world. Conversely, participants report a preference for conducting complex mission operations in real-world "hot-spot" locations. A simulated mission scenario requiring such manner of operations would promote an enhanced credibility that adds to the fidelity of the networked training. Additionally, such a strategy could encourage crewmembers to accept their mission tasking with appropriate seriousness and involved thought. It had been suggested that modifying the scenario in this way would dramatically increase their perceived level of training effectiveness.

Aircraft configuration and performance differences with training device fidelity. The MH-60G WST and HH-60G OFT have two different engine configurations programmed into their software. Instructors have indicated that their HH-60G crewmembers should perform the mission operations in the MH-60G WST. The perspective is that this device's "higher" fidelity with regard to motion and visual systems and aircraft systems, warrants use of this device in place of the "lower" fidelity HH-60G OFT. However, participant crews have questioned if the differences are important enough to warrant less than optimum, but similar to the aircraft, training in the OFT.

Manipulation and reprogramming for threat encounters is a difficult, time-consuming process. Instructors were observed to be reluctant, at best, to perform threat manipulation activities (e.g., changing locations, status, etc.) in the dynamic environment represented by joint operations. In the networked mode, a high level of coordination among instructors in each device must occur to place and activate threats without adversely affecting each other's training progress. The reported fear is that they may have an adverse effect on the other WSTs or OFTs. Regardless, the procedures and effort required to manipulate a threat has a perceived high potential to disrupt the network mission, and most instructors appear to feel that it is acceptable to limit training rather than change threat parameters. (We've seen this attitude in non-networked operations also).

Extensive mission "setup" procedures required to operate the training device. When instructors arrive at their simulator, they are required to set (i.e., "program") a number of simulator initial conditions for their particular mission involvement at their instructor operating station (IOS). These conditions are device-dependent, and variables must be specified for the exact coordinate position and orientation of the aircraft, weather and environmental conditions (e.g., illumination level, wind conditions, altimeter settings, etc.), route of flight, etc. Each instructor's mission set-up process is extremely complex and time consuming, and the programming process often requires in excess of 30 minutes to set every variable and fully ready the device for its intended mission objectives. Instructors are generally unable to enter the simulator early to preset their mission's variables in advance of the scheduled mission start time, as the simulators are typically being used for other training. As a result, the actual time dedicated to training is reduced, and crewmembers often find themselves waiting for the instructor to program the simulator to be "ready-for-training."

Visual system limitations require that aggressor helicopter perform a "head-on" attack. The WST/OFT's visual system limitation of providing only forward and side-views requires the aggressor helicopter crew to perform only head-on attacks. This requires great coordination effort between the TOC personnel and the aggressor helicopter crew to determine the location and track of the helicopter formation, to position (using slew function) the aggressor in front of the helicopter formation using the correct reciprocal track, and to perform the actual rendezvous. This procedure typically took several unsuccessful attempts before a single successful attack operation was performed.

Scenario Command and Control

MD lacks the capability to gain required information on training conditions. Presently, there exists no capability for the mission director, or any role player, to select a specific IOS in a particular WST or OFT. The MD reported a need to observe the specific conditions or training forces that are being experienced by a particular crew, to help identify particular system malfunctions and/or solutions. Without the capability to select and observe a particular IOS, systems analysis of scenario manipulation must be done only after extensive coordination (and distraction) with the affected instructor/operator.

Limited usefulness of TOC monitors to view mission progress. The TOC monitors have a limited utility to the MD and/or role player personnel who are located in the TOC. The monitors, when used to view the out-the-window view of the respective WST/OFT, are only useful to TOC personnel in daytime conditions with normal lighting. When nighttime conditions are used, the NVG presentation is extremely poor, and very little imagery is discernible to the TOC personnel. Secondarily, the Fulcrum's map display does not employ directionally based icons or track lines. TOC personnel are unable to flight follow, or determine if the crew is flying the planned flight course. This reduces the MD's effectiveness by increasing the workload to determine the mission's progress. Several instructors have indicated the value of placing a dynamic Track/Heading/Groundspeed readout next to each icon.

Dedicated communications line needed in TOC. There were many occasions when the simulation, or a particular WST, began to experience problems. The MD is in an ideal position to oversee or coordinate the Technical Support Group's (TSG) efforts to correct the problem. However, in the current configuration, the MD must physically leave the TOC and locate the TSG personnel. By the time he returns to the TOC with these individuals, the problem(s) may have manifested themselves in different ways. It was suggested on several occasions that a communications link (a phone line) from the TOC to the TSG would allow problems to be handled interactively and in an efficient manner.

Need direct communications among TOC and simulator instructors. Along the previous lines, TOC personnel are currently unable to communicate in private with any instructor in any WST or OFT, and conversely, instructors are unable to independently contact any other WST/OFT instructors. There were many occasions when an instructor in one device needed to contact or coordinate with an instructor in another device. In the current configuration, an instructor who needs to contact another instructor must first contact the TOC personnel, who must then relay the particular message to the desired instructor/WST. Additionally, these messages must be transmitted over one of the aircraft/device's communications radios that would otherwise be used by the crewmembers.

Unable to hear individual cockpit intercom without AVRS connections. In the current configuration, only the MH-53J WST or TH-53A OFT can be "hot wired" so that a crew's intercom may be monitored by TOC personnel, and then only one of these devices may be monitored at a time. To do so, the communications channels must be physically set up by trained AVRS personnel, and then routed into the TOC. TOC personnel are unable to monitor the MC-130P WST/SNS, the MH-60G WST, or the HH-60G OFT, as the AVRS does not have the capability to connect with these devices. The TH-53A was typically used as the aggressor aircraft, with instructor crews, thus the TOC had no requirement to monitor this cockpit crew. The MC-130P and MH-60G, however, were integral components of the mission, and the MD indicated a reasonable need to monitor their cockpit communications at will. Several comments were made that a selectable switch to permit the MD or instructor role-players to monitor any crew's interphone communications would greatly increase the effectiveness of their interventions.

Instructors need current Technical Discrepancy (TD) and Discrepancy Report (DR) listing to know what is written-up. Instructors indicated they are traditionally the last to know if and/or when a TD or DR write-up has been cleared. If instructors are briefed prior to the day's instructor meeting with respect to which simulator systems are or are not operational, this would significantly help the instructor's efforts to formulate an effective training plan for their crews.

Debrief lacks purpose. The MD states in the mission brief that the purpose of this mission is to "enhance situational awareness." There was no observed attempt, however, to ensure that SA is, in fact, enhanced. The debrief makes no mention of the SA aspects of the training, there are no debrief tools used, and the ensuing debrief discussion always turned to a systems and procedures discussion related to what happened (procedurally) vs. what should have happened. Crewmembers reported that the current mission debrief is anticlimactic, and requires a significant infusion of content to connect them to the value of the provided training. Additionally, they reported an inability to discriminate rationale for their participation in networked simulation training. While their participation in the demonstration of simulation technology was of great inspiration, the perceived value in outcome terms was, for the most part, an unknown quantity. Several crewmembers suggested that one reasonable purpose of this mission training is to promote joint mission operations and crew resource management (CRM) principles, as applied in a mission-oriented simulator training format. Thus perceived, it was suggested that the mission debrief should be explicitly designed to relate CRM principles and performance to the crewmember's real-world, joint mission operations experience.

Large number of instructors and support players to sustain participant crew training. SOFNET training requires almost a one-to-one crewmember/instructor ratio to support this training. On the surface, this may not seem a significant point, unless one considers that up to 18 crewmembers may be trained at one time. It was suggested that this is a very resource-intensive operation in this respect, and affects other resource management aspects of the total training system.

Using instructors as role players adds C2 realism to the scenario's development. Similar to the mission brief, it was suggested that the mission execution phase communications requirements should be formally scripted and integrated in a real-time format, and outside agencies (e.g., AWACS) should be included as separate role players. Specifically, crewmembers reported that they would incorporate a larger mission team into the scenario script, to include (typical) radio traffic to other players who may or may not be active on the net. They suggest that the primary advantage to such an approach is to keep the communications matrix active, and the aircrews invested in who is being called and for what purpose. Secondarily, this approach would tend to promote the "fog-of-war" concept by continually providing "distracters" to the aircrews. Crewmembers would then be forced to actively listen and make decisions based on information that may not be fully accurate.

Mission Elements

Dissimilar representations of threat environment for each aircraft. An observed problem in the IECSS network mode is that different aircraft on the network appear to have different representations of the threat environment (e.g., when in formation, the equipment in one helicopter shows no threats, while another indicates a missile launch). In one example, the MH-53J Radar Warning Receiver (RWR) correctly indicated a threat where programmed, while the MH-60G (who was in formation with the MH-53J) did not see it at all on their gear. In another case, the threat was represented as a completely different threat (requiring a different tactic).

Limited emphasis on mission planning with Special Operations Forces Planning and Rehearsal System (SOFPARS). The helicopter crewmembers are provided with (minimal) time, following the mission in-brief and coordination with the tanker aircrew, to mission plan. Their primary objective for the morning activities is to attend a SOFPARS training class that lasts over two hours. The class is oriented at providing an introduction and overview of the SOFPARS system only. Conversely, the MC-130P aircrew has a great deal of planning time to calculate their mission plan. SOFPARS is available for their use, but there are few instructors who are proficient enough in the vagaries of the system to effectively demonstrate this mission preparation method.

Differences in NVG vs. daytime mission execution protocols. In the current training practice, instructors are allowing their crews to select either daytime or nighttime conditions for their mission. While it is generally accepted that AFSOC crews will fly in NVG conditions, the ACC crews are being allowed to fly in daytime conditions. This is providing an unrealistic advantage over other participants. Secondarily, the aggressor TH-53A crew is provided an artificial advantage by performing their attack maneuvers in daytime conditions while at least one of the helicopters is operating in minimal NVG conditions.

Discrepancy between INTEL information and threats experienced. It was noted that INTEL information provided in the frag is not what the mission experiences. Crewmembers are subjected to varying levels of threats, depending upon their instructor's personal preferences. For example, the MC-130P crew may be experiencing no threats because they do not want the IECSS to affect the mission execution (process); or the MH-53J that is operating in the same database, may be experiencing a large volume of threat activity because their crew possesses a high level of knowledge on threat tactics. Regardless, there seems to be no standardization on how the threat environment will be scripted for each participant on the network.

Excellent opportunity for advanced tactics training. There is an apparent consensus among crewmembers that the ability to encounter threats and apply tactics in a real-time, networked environment is a simulation training advantage that cannot be replicated in the aircraft. It was suggested, however, that the mission script should include a greater threat saturation level for all network players. Along these same lines, if the MH-53A is to be represented on the network as a

the MC-130P?" As mentioned, crewmembers feel that the threat modeling capabilities of the network simulation are a significant advantage over standalone training because live threat encounters require thinking and acting in real-time to the unknown attributes of combat adversaries.

Disparate knowledge of the conduct of joint mission operations, multiple training strategies, etc. A wide disparity with respect to the application of multiple training strategies in the conduct of training for joint mission operations was demonstrated. While an instructor may have a high degree of knowledge of mission-specific procedures and regulations, and perhaps even possess some talent at simulator systems operation, only a few instructors demonstrated both qualifications. Beyond this, the ability to integrate the simulator capabilities into flexible training strategies, coincident with the mission's (vague) outcome objectives, was an extremely complex behavior that was demonstrated on only a few occasions.

"Learning Curve"

This section documents several notable observations regarding improvements that were made to the SOFNET training system and/or methods over the course of the study period. The momentum for these improvements were based on lessons learned from session to session, direct instructor input/feedback, and observation data culled from the primary researcher and fed directly back to the responsible development personnel.

Improved quality of mission briefings. Over the course of the observation period, the MD continually worked to enhance the mission in-brief. Specifically, this person continually worked to incorporate information regarding real-world aspects of mission operations into the mission in-brief. At the beginning of the observation period, the in-brief was no more than paper notes that the MD "read" to the crews. However, by the end of the observation period, the in-brief had progressed to high-quality Powerpoint slides with embedded cartographic and objective area photographs. Additionally, the briefing itself had progressed to include several operational factors (e.g., Intelligence, Command and Signal, CEOI, etc.).

Improved ability to overcome network problems. Soon after the observation period began, it became evident that the same network problems were being encountered on a session-to-session basis, and that these problems were simply not getting fixed (e.g., spontaneous system "crashes," unrecoverable loss of communications channels, etc.). At that time, the MD requested support from TSG to provide a dedicated individual (technician) to sit in the TOC for the length of each SOFNET training session. The purpose was to have the technician observe, in real time, the problems that were being encountered, the conditions leading to the problems, and the attempts to apply corrective actions, if any. This individual was also tasked to attend an instructor-only debrief period following the training session, where lessons learned would be shared for the benefit of all SOFNET principals. As a result, solutions and/or new procedures were developed to overcome several problems, and the network failure rate was significantly reduced.

Improved quality of mission preparation materials. The SOFNET team, from the beginning of the observation period, indicated an awareness and dissatisfaction of the lack of adequate mission preparation materials. Several instructors expressed a great desire to personally improve the quality of these materials, but were faced with limitations. First, the SOFNET training scenario was under continual refinement from session to session as the simulation and control systems, training methods, and understanding of joint operations training improved. This warranted, by necessity, an incremental approach to materials improvement, and thus, instructors were asked only to provide recommendations for improvement to the MD. The MD was charged with the ultimate and sole responsibility of developing these mission preparation materials, yet these could not be developed until the (previously discussed) higher priority network systems

problems were dealt with. Once the network problems were isolated and corrected, the MD, with assistance and input from several dedicated instructors, began work to improve the mission preparation materials. The result was a significantly enhanced set of crew-tailored mission packets that provided extensive mission planning and mission execution data (e.g., WX, route details, INTEL, etc.)

Improved instructor communications. Very soon after the observation period began, the MD implemented a (scheduled) one-hour meeting, attended by the MD, all SOFNET instructors and TSG personnel, held immediately preceding the crew's arrival at the simulator for their mission execution phase of training. There were several reasons stated for implementing such a meeting. First, it was noted that instructors were only required (and scheduled) to be present for training activities when their crews were scheduled. It became self-evident very quickly that instructors needed training in TOC systems operation. These same instructors, who are fully capable of operating their WSTs/OFTs, were also not fully aware of what the TOC could or could not do to affect the mission's process or outcome. While this was not a requirement to perform the scripted operation, it was determined that a good working knowledge of how the TOC operates and/or is limited would help instructors understand where work-around solutions to problems may need to originate. Second, and as previously discussed, instructors needed current TD and DR listings to know what is written-up. This meeting facilitated discussions between maintenance and instructors to determine what write-ups had been cleared. Finally, the meeting served to provide a source of discussion on conduct of joint mission operations, multiple training strategies, etc. This served the purpose of inspiring techniques to integrate the simulator capabilities into flexible training strategies, coincident with the mission's objectives.

Survey Results

This section summarizes results of the surveys completed by the 99 crewmembers who participated in nine SOFNET missions. The first subsection describes major findings from the analysis of the quantitative rating data. The statistical analyses reported are based on the raw data table presented in Appendix B, in which ratings on each mission element from each participant are tallied. These data are organized by crews, with duty position and weapon system for each crewmember listed in the column heading. The second subsection presents results of the analysis of the qualitative, comment data. These analyses are organized into two categories: (1) responses to survey questions concerning four phases of the SOFNET mission: in-brief, planning, execution, and debrief, and (2) supplemental comments on the 33 mission elements that were rated.

Quantitative - Rating Data

Table 3 presents the mean ratings, averaged across all crews and crewmembers, for the 33 mission elements that were surveyed. The mission elements are listed in descending order of mean rating, with the element name preceded by the item number that appeared in the survey. The third column indicates number of participants (N) who responded to that item. Since some elements were not applicable to certain crew positions and weapon systems, the total N is typically less than 99.

As seen from the table, all elements received rather high ratings. Even the lowest rated element, Checklist Procedures, was above the scale midpoint of 3.0. To determine the degree to which the SOFNET mission elements were rated positively, we compared each mean against a hypothetical value of 3.0 using a t-test. The results of that analysis are shown in the right-most column of Table 3. The equation for this test is: $\mathbf{t_N = (M\text{-}3)/(S/vN)}$, where N is the number of subjects responding to that item, M is the mean rating of the item, and S is the standard deviation of individual item responses. Asterisked mission elements in the t-column tested statistically significant against an experiment-wise alpha level of .05, based on a nominal alpha of .0015. The

latter is derived from a Bonferroni adjustment for multiple tests (Harris, 1994) corresponding to EW alpha = .05/33 = .0015. A two-tailed test was used, where depend-ing on the N, the critical t-value ranged from 2.75 (for N < 40) to 2.64 (for N > 80) (Winer, 1972).

As evident from the table, all but two mission elements were rated significantly positive (i.e., above the scale midpoint, 3.0) by SOFNET crews. Thus, only Airdrop Operations and Checklist Procedures failed to achieve a statistically significant rating. Importantly, overall value of networking simulation (element #33) was rated positively. Note that this test was especially conservative as participants were only allowed to assign a maximum rating of "4." This was because we felt the "5" rating used for the other elements, signifying a "networking is essential for this element," was not a logical possibility for overall value assessment. Despite this conservatism, we still achieved a statistically significant positive rating for the overall value. The high value attributed to networked simulation is further evidenced by the fact that three participants spontaneously penciled in a "5" on their survey sheets (though they were counted as "4" in our analysis). Hence, it is clear that most participants felt that networked CMT represents a substantial benefit over traditional standalone training.

An interesting trend in these data is the most positively rated elements, those appearing at the top of the table, involved coordination among multiple players. Indeed, the seven elements with mean ratings of 4.0 or higher were Multiship Tactics, Aerial Refueling (AR) Operations, CSAR Operations, Formation Flight, Situation Awareness, Command and Control, and Mission Team Coordination. All elements require integration of crew efforts to be successfully completed and, as such, their positive ratings are consistent with the stated purpose of network training to support integrated crew operation; it is also consistent with the crews' general comments.

Table 3. Crewmember Mean Ratings of Mission Elements

Mission Element	Mean Rating (1 = low, 5 = high)	N	*t*-value
9. Multiship Tactics	4.2	84	13.87*
15. **AR Operations**	4.1	93	10.23*
11. **CSAR Operations**	4.0	59	7.84*
17. **Formation Flight**	4.0	74	9.75*
23. Situation Awareness	4.0	97	12.28*
25. Command & Control	4.0	95	12.67*
32. Mission Team Coordination	4.0	93	12.54*
14. **Transload Operations**	3.9	61	7.99*
24. Time Management	3.9	97	12.36*
31. Mission Debrief	3.9	93	11.80*
3. Mission Briefing	3.8	96	10.12*
8. Secure Comms	3.8	84	7.01*
18. **In-Flight Formation**	3.8	96	9.56*
22. Crew Coordination	3.8	96	9.40*
27. Mission Diverts	3.8	77	9.28*
1. Mission Planning	3.7	95	9.85*
10. Threat ID and Response	3.7	87	7.79*
28. **Infil/Exfil Operations**	3.7	74	8.28*
19. Threat Avoidance/Evasion	3.6	93	8.02*
29. Fuel Management	3.6	90	7.95*
6. **Low Altitude Operations**	3.5	93	6.80*
13. Weapons Employment	3.5	65	4.72*
2. Tactics Planning	3.4	94	5.95*
5. **Night Operations**	3.4	92	6.10*
7. Radar/FLIR Interpretation	3.4	85	4.66*
30. Chaff/Flare Management	3.4	82	5.67*
4. Low Level Planning	3.3	93	4.33*
12. **Airdrop Operations**	3.3	36	2.53
16. Terrain Familiarization	3.3	90	3.70*
21. Systems Malfunctions	3.3	95	3.80*
26. Minimum Wx Operations	3.3	81	4.62*
20. Checklist Procedures	3.1	94	2.18
33. Overall Value	**3.7**	**88**	**18.83***

* p < .05 experiment-wise

Although the ratings suggest that the SOFNET training was highly valued overall, we probed the survey rating data further, to ascertain if there were any notable differences in ratings across crews, weapon systems, and crew positions. Figure 2 depicts the average ratings and overall value rating for each of the nine crews that were surveyed. For each crew, we derived a single average rating by summing the ratings across all crew positions and all mission elements. To determine if there is any trend in crew perceptions of the value of networked training over time, the crews have been numbered chronologically. In addition, we have put the number of crewmembers who participated in the mission in parentheses (i.e., the number of crew positions that occupied WSTs across the sessions).

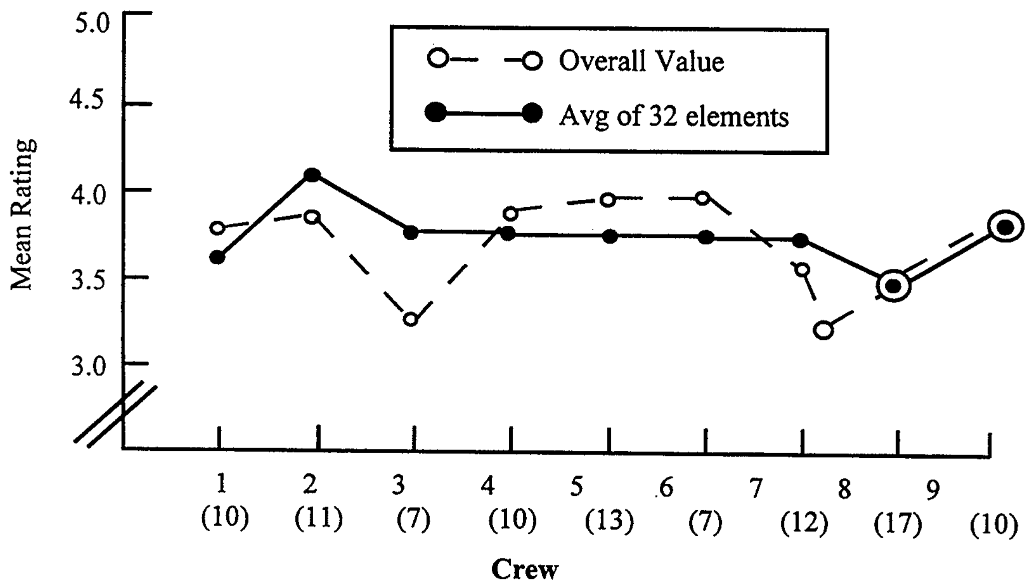

Figure 2. Average Mission Element Ratings across the Nine SOFNET Crews.

It is evident from the figure that there are no significant trends in the rating data over time. For example, the average rating of the 32 mission elements (solid circle) varied only between 4.1 and 3.5 across all nine crews. There is clearly no evidence for either a downward or upward trend over time in the ratings. While the average ratings for the overall value element were more variable, ranging from 4.0 to 3.3, it too showed no evidence of any differences between the earliest SOFNET crews and the later ones.

We then looked at the average rating data by weapon system, collapsing across crews, crew position, and mission element. Again, we have a separate report for the average of the 32 mission elements and the 33rd rated element, overall value. We retain the separation since we believe the two items are tapping fundamentally different perceptions regarding the value of networked training.

The results of this breakdown are shown in Figure 3 where the number of crewmembers who participated in the training is indicated in parentheses. Once again, we see no evidence of any rating differences across the three weapon systems for either the overall value rating or the average of the 32 mission elements. The lack of difference is somewhat surprising because we had suspected that the MH-53J crews, by virtue of having the scenario tailored to their requirements, might have a more positive perception of the networked training. But as is evident from the rating data, this was simply not the case.

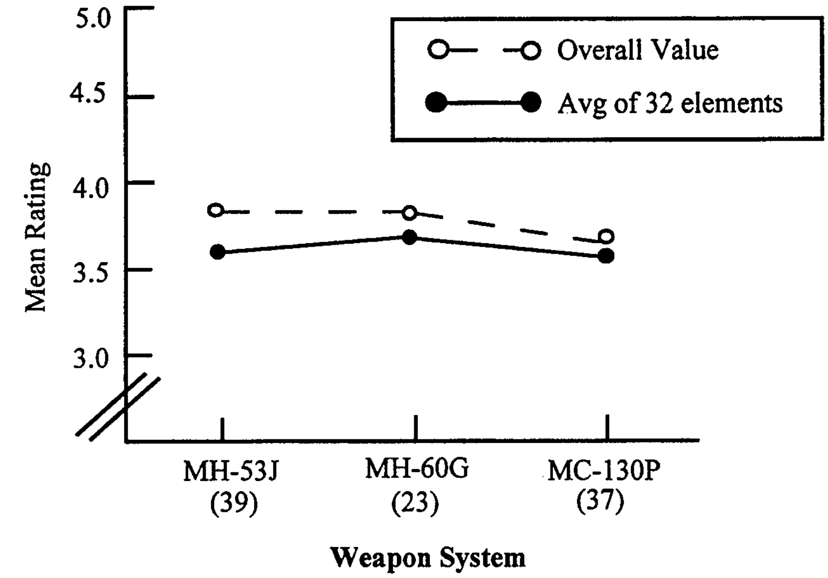

Figure 3. Average Mission Element Ratings across Weapon Systems.

Finally, Figure 4 presents the average rating data by weapon system *and* crew position. In contrast to the two previous analyses, the data in this figure suggests that pilots exhibited a strong preference for integrated over standalone simulation training compared to their non-pilot counterparts. Moreover, this difference is evident for all three weapon systems, not just the MH-53J, and is more apparent for the overall value rating than for the average of the 32 mission elements.

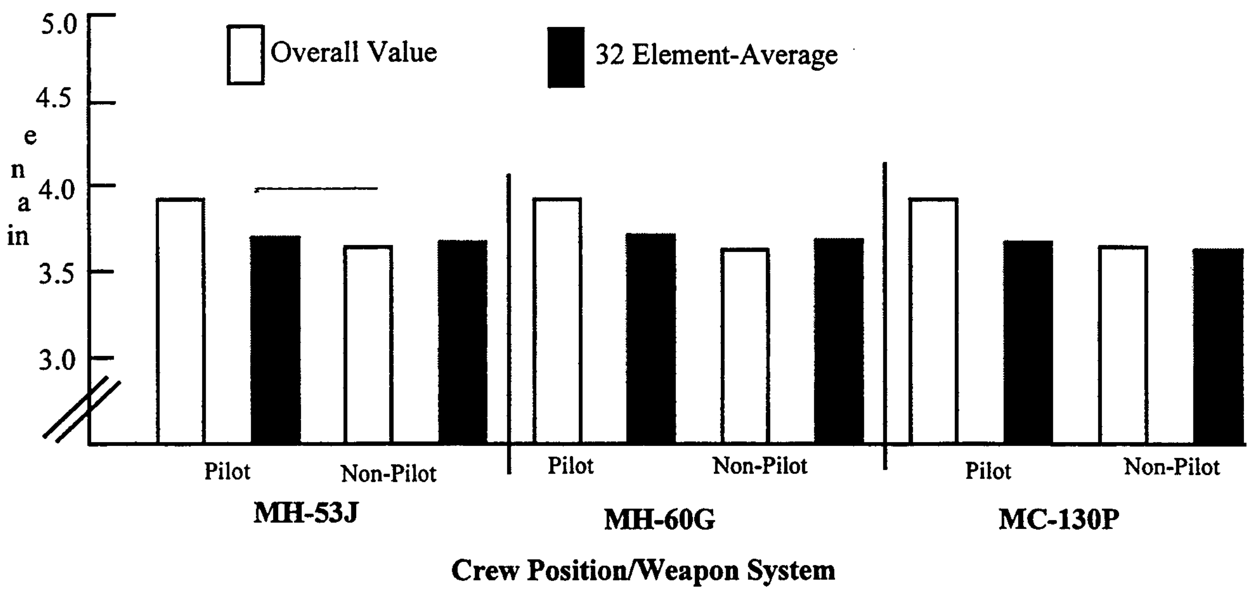

Figure 4. Average Mission Element Ratings by Crew Position and Weapon System.

To assess these differences statistically, we first computed the average standard error about the mean using all 33 mission elements (including Overall Value). This value was .077. Multiplying this value by 2.5 produces a 99% confidence interval (CI) that can then be applied in a series of mean differences tests using a planned comparison methodology (Hays, 1973). The resulting value was .193. Placing 99% CIs of this size around each mean, we see that significant

differences are obtained between MH-53J pilots and non-pilots overall value rating (3.88 - 3.65 = .23) as well as between the MC-130P pilots and non-pilots (3.85 - 3.62 = .23). The difference for the MH-60G pilots and non-pilots (3.85 - 3.67 = .18) just missed statistical significance.

Crew Comments on the Mission Elements

The survey booklet contained space to the right for crewmembers to make comments on the 33 mission elements. Of the 99 participants, fully one-third (34%) took the opportunity to record comments on the survey sheet to one or more of the elements. Their responses are presented in Table 4. Within each element, the comments have been organized by weapon system and duty position. To facilitate the discussion, we organize the mission elements into five higher level categories: planning and briefings, visuals and terrain, tactics and operations, communications and procedures, and team interactions. The elements comprising each category are listed next to the category name.

Table 4. Supplemental Crew Comments on the Mission Elements in the SOFNET Survey

Mission Element	Participant	Comment
1. Mission Planning (MP)	53P	Need more time (to integrate) with all players.
	53P	More (MP) time would be useful.
	53P	Were some mission holes (i.e., IMOM product w/threats degraded, LZ with incorrect coordinates, incomplete terminal ops data (imagery, etc.)
	53P	Mission was already planned (too much preplanning done).
	53P	SOFPARS maps are (unusable). Need to use real mission charts.
	53FE	Allows flying crews to do more of the plan.
	53FE	All crews/crewmembers need to all be present at the same time.
	60FE	Crews should have had more time to mission plan.
	60FE	MP is useful for familiarization with how other crews plan; but is it realistic?
2. Tactics Planning	53P	Forces Helo and Shado crews to discuss tactics in threat environment.
	53P	Aacceptable for scenario.
	53P	Would be better if more crew interaction time were provided.
	53FE	Allows flight crews to do more of the plan.
	60P	Useful for familiarization w/how other crews do tactics; but is it realistic?
3. Mission Briefing	53P	More time needed.
	60FE	Useful for familiarization w/how other crews brief; but is it realistic?
4. Low-Level Planning	53P	Was planned for us.
	53P	Need to plan w/60 crew.
	60P	Need a map, not 20 pages of AFMSS/SOFPARS/IMOM.
	60FE	Useful for familiarization w/how other guys do it; but is it realistic?
	130CSO	I don't plan.
5. Night Operations	53P	Hard to fly multiship at low illumination.
	53P	Excellent.
	53FE	All players should be same, day or night.
	60P	Graphics were disorienting and terrain was hard to make altitude judgments.
	60P	Got pretty dark a few times.
	60FE	Useful for familiarization w/how other crews do it; but is it realistic?
	130CSO	I was in the SNS.
	130CSO	Does not matter for RO position.
6. Low Altitude Operations	53P	Terrain difficult to see.
	53FE	You have to take into account others' capabilities.
	60P	Graphics were disorienting and terrain was hard to make altitude judgments.
	60FE	Useful for familiarization w/how other crews do it; but is it realistic?
	130CSO	Does not matter for RO position.
7. Radar/FLIR Interpretation	53FE	Radar went out too much.
	60P	Useful for familiarization w/how other crews do it; but is it realistic?
	60P	FLIR was a must to see lead in some of the terrain.
	130P	FLIR picture today was terrible.
	130P	Radar does not work as well networked.
	130CSO	Does not matter for RO position.
	130Nav	Liked real helo with real people.

Table 4. Supplemental Crew Comments on Mission Elements in the SOFNET Survey (Cont'd)

Mission Element		Participant Comment
8. Secure Communications	53P	Still not good.
	53P	Need SATCOM/VHF secure.
	53P	No pretending in network.
	53FE	Just like the real thing--bad communications.
	53FE	Didn't like it; need real-world high priority with multiple problems.
	60P	Poor rating; need to practice using secure.
	60FE	Useful for familiarization w/how other crews do it; but is it realistic?
	130Nav	Face to face with customer is important for comm and tactics.
	130CSO	Realistic.
	130CSO	Not realistic.
	130CSO	Didn't do real secure.
9. Multiship Tactics	53FE	Not knowing the position degrades multiship.
	60FE	Need better brief w/understanding of Pave Low capabilities.
	130P	Does this question beg an answer
	130CSO	For RO position it doesn't matter if we're networked or standalone because of our crew position in the SNS (this applies to all elements).
10. Threat ID and Response	53P	Some threat indicators were false.
	53FE	Not good; recommend dedicated 1/2 sortie for this.
	60P	Liked this; don't know how often this gets accomplished by day-to-day flying.
	130P	Too many delays compared to standalone.
11. CSAR Operations	53P	Very realistic.
	53FE	Need to look at threat responses in dissimilar A/C (is a criticism).
	60P	Didn't really do this today.
	60P	Not done.
	60P	This was a special operation.
	60FE	Problem solving: how can we pick up these guys when we're overloaded?
12. Airdrop Operations	53P	Excellent
	60FE	Negative ratings are because for me, I was cut out of much of the scenario because of ICS limitations. If we're going to play the game, let everyone on the crew in the game. Had this been the case, my opinion might have been better (this applies to elements 12-25).
13. Weapons Employment	53P	Better if two can direct response.
	53FE	Not sure; waiting for gunner sim.
	60FE	The gunner's sim would greatly enhance this.
	130P	We never work alone (positive comment).
14. Transload Operations	53P	Never got there
	53FE	More hose pressure from tanker
15. Air Refuel Operations	53P	Seems too sensitive.
	53P	Outstanding!
	53P	Caused sickness and pain.
	53P	Worthless.
	53FE	Unrealistic/computer problems with lights.
	60P	Much more realistic.
	60P	Real tough to do; can't see tanker on right hose from right seat.
	60P	Tough to AR in the sim.
	130Nav	Liked real helo with real people.
16. Terrain Familiarization	None.	
17. Formation Flight	53P	We were always lead.
	53P	Very hard to determine closure rate.
	53FE	As lead, unable to see formation.
	60P	Graphics were disorienting and terrain was hard to make altitude judgments
18. In-Flight Problem Solving	53P	Great!
	53FE	Excellent scenario; realistic!
	60P	Must include more variables.
	60P	Sim is great place to solve problems.
	130P	Liked having random requests come in that required working with other team members to solve them.
	130Nav	The opportune AR was realistic.
19. Threat Avoidance/Evasion	53P	Better if two can direct response.
	53P	Great!
	53FE	Not many threats.
20. Checklist Procedures	None.	

Table 4. Supplemental Crew Comments on Mission Elements in the SOFNET Survey (Concluded)

Mission Element	Participant Comment	
21. Systems Malfunctions	53P	Better because of other players' inputs
	53P	Other crews can support
	53FE	Outstanding! made us work but left us a way out
	60P	Sim is great place to solve problems
22. Crew Coordination	60P	Must include more variables.
23. Situation Awareness	53P	Other aircraft help to keep SA, especially in threats.
	53FE	Flight lead's tactic may depend upon formation position. We can't see behind us.
	53FE	Enhances greatly.
24. Time Management	53FE	Flight lead's tactic may depend upon formation position. We can't see behind us.
	130CSO	We were rushed because it was after 1700.
25. Command & Control	53P	Gets more complicated.
	53FE	Flight lead's tactic may depend upon formation position. We can't see behind us.
	53FE	Excellent coordination; some A/C slow to respond
26. Minimum Wx Operations	53P	Can be detrimental if other aircraft not TF/TA.
	60FE	Need better brief w/understanding of Pave Low capabilities.
	53FE	Ideally, we want poor Wx (more simulations).
27. Mission Diverts	130CSO	We don't get a lot of those. It was good practice.
28. Infil/Exfil Operations	53P	See other aircraft in LZ and coordinate joint ops.
29. Fuel Management	53P	Must work with other aircraft.
	53FE	Need to make fuel flow realistic during mission.
	130Nav	Realistic because helos actually have need for gas.
30. Chaff/Flare Management	53P	Must coordinate who expends.
	53P	We lost all our chaff for no reason.
	53FE	Need to look at tanker/helo AR flare/chaff (liked this).
	60FE	Need better brief w/understanding of Pave Low capabilities.
31. Mission Debriefing	53P	Great interaction and learning after joint practice.
	130Nav	Again, face to face is better than simulation.
32. Mission Team Coordination	53P	Need role player's aircraft as the ground team, etc., to keep the training realistic inside the aircraft.
33. Overall Value	53FE	Better, but not that spectacular; keep working, it will be excellent!

Planning and Briefings (MEs 1, 2, 3, 4, 31)

A number of participants cited the need for more time to conduct planning. They also indicated dissatisfaction with the computerized SOFPARS maps, preferring instead paper maps. Though it did not always happen, the crews liked having everyone get together at the start of the mission as it helped them become familiar with dissimilar aircraft issues. In addition, some crew positions reported little involvement in planning, such as the CSO on the MC-130P. However, this appears to be more an issue of typically assigned crew duties rather than integrated simulator training. There were mixed comments regarding the realism of the scenario, with the prevailing view that it was acceptable given the types of tactics being trained. But as one participant noted, "face to face is better than simulation" indicating the need for group interactions both before and after the mission.

Visuals and Terrain (MEs 5, 6, 7, 16)

Crew comments were mixed regarding the quality of simulator visuals and terrain. Several pilots reported having difficulty seeing the terrain while flying low level. This is undoubtedly related to the illumination level used in the mission. Also, there were some complaints regarding the operation of the radar and FLIR, with several pilots reporting that it did not work as well when networked. As well, some pilots reported that the graphics were "disorienting" and the terrain "difficult to see." One pilot commented that all WSTs should have the same visual, day or night, which was not always done in the SOFNET missions.

Tactics and Operations (MEs 9, 10, 11, 12, 13, 14, 15, 17, 19, 26, 28, 29, 30)

This category encompassed a number of diverse mission elements. Tactics involving threats received mixed reaction, with some participants citing the lack of realism while others touting the value of practice that is not always possible back at the squadron. Regarding weapons employment, there is clearly a consensus that realism will be greatly enhanced once the AGSS comes on line. In a comment that is equally relevant to the preceding category, formation flight seemed to pose problems for several crews due to insufficient quality of the visuals. In addition, several crews commented that fuel and expendable management would be improved if there were more extensive briefings on the capabilities of dissimilar aircraft. There was considerable negative reaction to the AR part of the mission. Some participants cited problems in seeing the tanker while others thought the hose pressure was unrealistic. As discussed elsewhere in the report, there is a larger problem concerning the master/slave relationship with the networking, and how instructors can work together to control the simulation environment.

Communications and Procedures (MEs 8, 20, 21)

One of the most frequently cited problems concerned the inability to achieve secure communications during the networked mission which many believed hurt the overall realism of the scenario. Despite this problem, one participant indicated that these communication problems were actually good training strategy since it mirrored what is found during actual operations. Interestingly, several crewmembers cited some value added that networking provides for systems malfunctions training as it permits a crew to get inputs from another team. The lack of comments for Checklist Procedures is consistent with the low rating that this element received.

Team Interactions (MEs 18, 22, 23, 24, 25, 32)

As expected, the bulk of the positive crew comments fell under the category of what may be called "team interactions." A number of participants stated that the networking environment was an excellent place to attempt different solutions to problems, although one pilot felt that more complex variables should be included in the scenario. Several expressed the belief that crew situation awareness is enhanced by having other players present in the scenario, particularly with regard to tactics employment in the threat environment. Although rating data support the crews' overall high assessment of the training potential for networked simulation, one helicopter pilot noted that it is important for the instructors or role players to keep the script "realistic" inside the aircraft. This issue will be further discussed in a later section, when we offer some recommendations for improving the SOFNET training method.

Qualitative Comment Data - Responses to Networked Training Questions

The first page of the SOFNET survey asked participating crewmembers four questions concerning their perceptions of the value of networked training. Each question pertained to a particular phase of the training session. The first question addressed the value of the crew mission briefing. The second question assessed crewmembers' perceptions of the realism of the mission script. A third question probed different ways that the mission plan might have changed as a result of interactions with other team members. The fourth question asked crewmembers to estimate the likely impact of networked training on real-world mission success. Finally, space was provided on the survey for crews to note any additional comments they might have concerning the value of networked training.

Overall level of responsiveness to the survey itself was quite impressive. All 99 crewmembers took time to comment on virtually all of the questions. Indeed, of the 396 opportunities to make comments (i.e., 4 questions by 99 participants), 376 (95%) of the response slots contained comments. Moreover, though not required, almost half of the participants (48) took

the opportunity to record additional comments in the space provided. Viewed as a whole, the high level of crew responsiveness to the SOFNET survey speaks not only to their desire to have direct input into the future directions of networked training, but in their confidence that their comments will be seriously considered by the 58 TRSS. The result is a substantial database of highly insightful and detailed comments that delineate many of the strengths and weaknesses of networked training as presently practiced at Kirtland AFB.

In the following subsection, we summarize the crew responses to each of the four questions. For each question, a commonality analysis was performed in which the most common responses were tallied, distilled, and rendered as a modal response. The raw comment data on which this analysis is based are presented in Appendix B. As seen there, the data are organized by crew, with responses to the five (including additional comments) questions forming the columns.

Question 1: How clear was your specific role as a network player in the mission script once the in-brief ended? What might have been done during the in-briefing to help clarify your role or requirements?

For the most part, the SOFNET crews indicated their specific role was fairly clear from the briefing. A typical response to this question was that it was "mostly clear except for . . . " The response that followed tended to vary across crews, reflecting minor changes that the instructors made to the mission script over the course of the SOFNET study. For the 10 members of Crew #1, everything was clear in the mission in-brief except "that no h-hour established." The lack of a specific time for this action made it difficult for crews to incorporate time deviations and other "what-if" type of factors into their plan.

With regard to Crew #2, several factors were mentioned as missing from the in-brief, although 4 of the 11 crew members were content with the in-brief as given. Of the in-brief factors that were critiqued, three crewmembers indicated that more mission planning time should have been allotted. In addition, one crewmember noted that the "comm package was weak," and one participant stated that the ATO/SPINS did not provide enough supporting materials for backend crewmembers to formulate an evasive plan of action (EPA).

Crew #3's responses to this question were quite varied. Two of the seven crewmembers were content with the in-brief presentation. One of the FEs criticized the limited role his crew position played in the mission as a whole. Two others cited the lack of explicit rules of engagement (ROE) in the in-brief as well as the very limited imagery available in the objective area. Finally, one MH-60G pilot felt that the capabilities of the H-60 were not sufficiently addressed during the in-brief.

All 12 members of Crew #4 were complimentary of the mission in-brief. There were only two suggestions for improvement. One crewmember indicated that a better discussion is needed on the intentions of the ground forces in the LZ. Another member suggested that a FRAG sheet should be provided that puts all the key mission data on the crew's kneeboard.

Crew #5 was equally complimentary of the mission in-brief. All 13 crewmembers cited the clarity and detail of the in-brief. Nevertheless, two crewmembers suggested that more planning time be provided. In addition, one crewmember recommended that an EPA be incorporated into the plan whereas another participant cited the need for "better charts."

Similarly, all seven members of Crew #6 commented on the adequacy and sufficiency of the mission in-brief. In fact, none of the participants from this crew indicated a need for any additional information.

Ten of the 12 members of Crew #7 expressed a positive response that the mission in-brief was clear. Two participants noted that the mission plan could be improved by incorporating an ATO into the briefing package.

Sixteen of the 17 members of Crew #8 were pleased with the information that was presented in the mission in-brief. Only two additions were cited as necessary. One crew-member indicated a need for additional charts of the objective area. A second participant, an MH-53 pilot, commented that additional information on aircraft weapon capabilities would be helpful during the in-brief.

Finally, all ten members of Crew #9 responded that their required roles were made very clear during the mission in-brief. Only one participant, an MC-130 pilot, noted that some additional directions from the mission commander (e.g., 3-engine airdrop requirements) should have been incorporated into the mission in-brief and mission plan.

Question 2: Were there aspects of the mission script that required you to support the actions of another crew that were artificial or unrealistic?

An impressive two-thirds of the participants (67) responded that the mission script did not require them to perform in artificial or unrealistic ways in order to support crewmembers from another WST. This result suggests that the SOFNET mission script struck a fairly even balance between establishing the objectives for an actual combat mission while ensuring that each participating weapon system had some meaningful tactical tasks to perform during the four-hour mission.

On the other hand, one-third of the crew members we surveyed responded with one or more critiques concerning the unrealism of the mission script. These critiques fell into one of five categories: simulator capabilities, mission conditions, terminal area tactics, role playing, and mission objectives.

With regard to *simulator capabilities*, five of the participants noted that, although the demands of the mission required that the MH-60G have the more capable 701C engine (which is in the actual aircraft), the WST has the less powerful 700 engine in the aero package. The result was an inability to perform the required aerial refueling on a consistent basis. Another comment that several crewmembers made was the distraction caused by hearing the "admin traffic" between the instructor pilots (IPs) in the different WSTs. In addition, although many participants believed that having to use the UHF radio for the command net added to the mission's realism, one crewmember considered it "artificial." Moreover, one MH-60G pilot noted that having a real-world database would improve the realism of the tactical coordination required with the MH-53J weapon system.

Perhaps the most significant criticism in this category involved the fact that the MC-130P, MH-53J, and MH-60G WSTs "did not have the airspeed comparisons that matches the aircraft." This mismatch required that the MC-130P fly close to stall speed while performing ARs with the helicopters. As one helicopter pilot noted, this made the planned AR only "marginally realistic." Moreover, one MH-53J FE noted that while the script was "very good and well thought out," the mission would probably use two MH-53Js.

With regard to *mission conditions*, a related problem that four participants cited was the unrealism of the original temperature and density altitude parameters within the LZ given the limited power available for the MH-60P. One helicopter pilot indicated that they had to "lower the temperature" in order to perform the required pick-up. Another factor that was reported concerned the MC-130P's requirement to penetrate a high-threat area in order to perform the

airdrop. While several participants cited the unrealism of this requirement, they also noted that it was good training and "lots of fun" given the briefed threat scenario.

Within the *terminal area*, several tactical aspects of the mission were criticized. First, one MH-53P pilot felt that the indications from one of the SAM sites was "bogus." In addition, several of the MH-53J crewmembers critiqued the use of secure radios during calls for fire support. Instead, they noted that for real-world operations, the calls would be "in nonsecure mode for quick, clear, and concise communications." As well, one of the MC-130P pilots stated that the threat level in the DZ was too high for the tactical requirements of their weapon system. One of the MH-60G pilots expressed disbelief that under real-world conditions they would have been able to insert two Special Forces (SF) teams at the same time.

Several aspects of the *role playing* required during the SOFNET mission were criticized as needing further improvement. First, one of the crews had experienced problems with their visual system, which forced them to "role play" more of the scanners' functions. Also, the lack of wraparound visuals in the WST gave them less scanning capability than they would have in the aircraft. Second, one MC-130P pilot noted that it was unrealistic to drop the SF team to secure the FARP/transload site given the threat level in the area. Third, several non-SOF pilots from the Search and Rescue (SAR) squadrons critiqued the unrealism of supporting an infil/exfil mission. On the other hand, they also lauded the unusual training they received as a result.

Finally, the SOFNET *mission objectives* were criticized by several of the participants. On the one hand, several MC-130P pilots noted that one of the required helo ARs was unrealistic given the threat level in the DZ. Moreover, another MC-130P pilot complained about the lack of a role player in the scenario whose inputs would "affect our (MC-130P) decision making realism." In addition, several pilots doubted that both the MH-60G and MH-53J would be able to fit into the terminal area to drop the SF team in the building.

Question 3: In what ways did your mission plan change as a result of interaction with other mission team players? What team interactions were helpful or not helpful? What other team interactions would have made the training more realistic?

The vast majority of the survey participants responded to one or more parts of this question. With regard to mission plan changes prompted by team interactions, four changes were cited most often, all of which were considered positive from a training impact. The specific change to the plan varied across crews, reflecting minor modifications to the mission script imposed by the instructors.

First, many crewmembers lauded the training benefits associated with having to slip the MC-130P's ARCT because of the late takeoff time by the helos. Second, the nature of the AR (i.e., orbit point, track) had to be changed due to the helo "going single engine." Third, one of the helicopter crews noted that they had to change their planned ingress after diverting to pick up a downed HIND crew. Fourth, another crew had to alter its plan in-flight in order to perform an unplanned AR. In all cases, these changes to the mission plan were viewed favorably since they are "very helpful for coordinating with other aircraft."

Participant response to the second part of the question, the nature of the team interactions, contained a mix of positive and negative viewpoints. On the positive side, a number of MH-60G crewmembers lauded the opportunity to meet face to face with the MH-53J crews, thereby learning more about the limitations of the Pave Low weapon system. In a similar vein, one crew expressed a positive reaction to having a "face to face" with members from the other WSTs to compare specific elements of their plans, such as initial points (IPs), control points (CPs), infil/exfil coordinates, and minimum safe altitudes (MSAs). In addition, a number of crewmembers expressed the feeling that interactions between the tanker and helos during the AR were very

useful for training, and were certainly superior to "having instructors insert moving models" into the database. Moreover, the crews were uniformly positive about the training benefits of the manned HIND aggressor's (played by an instructor in the 53A OFT) impact on the two helicopters' ingress route and en route times.

On the negative side, several MH-60G FEs commented on the limited capability for effective communications during parts of the mission. In a similar vein, crews from all WSTs commented on distractions posed by the audible team interactions over the intercom. As well, crews that contained a mix of AFSOC and ACC CSAR crewmembers indicated that more face-to-face time was needed in order to clarify differences in terminology, procedures, and tactics.

Finally, a number of survey respondents provided very clear and insightful comments regarding other team interactions they would like to see incorporated into the SOFNET mission scenario. Foremost among the possible changes to the SOFNET scenario is the need for more planning time to iron out differences in procedures (e.g., formation lights, comm out) between the MH-53J and MH-60G weapon systems. As part of this change, several crewmembers recommended that some general planning time be allocated so that the crewmembers from all the WSTs can "get together to iron out differences." In addition, some face-to-face time prior to the mass briefing would also be useful and would "more realistically simulate" the activities of a Joint Special Operations Command (JSOC) exercise.

Agencies that were cited as needing to be role played in the scenario include ABCCC, SOCHQ, and AWACS. Several crewmembers indicated a need to have more threats located in the en route phase of the mission. Another crewmember recommended a ground-team, scripting sheet be developed to guide activities within the LZ and objective area. Furthermore, several helicopter pilots expressed the need to have the aerial gunners/scanners participate in training as the lack of scanners seriously increases pilot workload. This capability will be available once the AGSS has been placed on the SOFNET node and integrated with the other WSTs.

Question 4: How is training in a joint networked simulation mode likely to affect your real-world chances for mission success? Which areas of the mission are most likely to be affected? Please explain.

All but four of the survey participants responded to this question. With regard to the first part of the question, respondents were uniformly positive regarding the effect of networked simulation on perceived chances for mission success. In fact, only 4 of the 95 participants who responded to this question expressed negative sentiments concerning the effect of networked training. Comments like "not likely to affect role personally as an FE" are typical of this minority viewpoint.

For the 91 participants who lauded the effect of networked training, a wide range of insightful and exciting opportunities for improving mission success was stated. One of the most frequently cited comments (15) was that the SOFNET training has the potential to simulate the "fog of war" through creation of inadvertent malfunctions and the inevitable "technical glitches" that occur when multiple systems are tied together. As such, it serves as a valuable MR tool that allows crews to practice techniques and tactics not possible in JRTs or other live exercises.

Another impact area that was mentioned concerns the capability of the networked simulation to promote the practice and honing of key tactical skills. Twelve participants responded with examples in this category, including such tactics as EPs, bump plans, single engine maneuvers, and AR. With regard to AR, subareas that would likely be facilitated include selecting alternate tracks and altitude in the event of bad weather, doing more realistic "pop-up ARs," and scheduling ARs before or after insertions.

A third area that was reported as receiving a boost from networked simulation was C2. Thirteen participants provided responses in this category. Typical responses included such benefits as: improved "comm planning," exposing communications as the "weak link" in the plan, teaching communications between the joint commands and their different ways of operating, teaching commanders who will become AMCs, instilling "flexibility" in C2 interactions, developing the "big picture orchestration," seeing how comm changes impact the mission plan, observing the impact of "lost comm" on mission outcome, and reaffirming the mandatory comm channels.

A fourth area that would benefit from networked training involves learning the capabilities and limitations associated with dissimilar platform operations. Eight participants provided responses in this category. Besides exposing the crews to advantages and disadvantages of other airframes, networked simulation will also help reduce the language barrier between the different commands and squadrons. Crews will learn specific dissimilar formation tactics (e.g., rotor clearance, power requirements, LZ requirements), as well as be exposed to problems that can arise when executing dissimilar platform tactics.

A fifth area cited by 11 participants concerns planning and replanning. Among the benefits cited for planning includes the opportunity to do what-iffing, validate route timing, cross check waypoint selection, observe threat indications, prepare threat avoidance tactics, and provide mission briefbacks to squadron and wing commanders.

A sixth area that was cited involves coordination of higher level tactics and plans among crewmembers, crews, and commands. Of the 13 responses in this category, the major virtues of networked training were seen in such subareas as getting together after the routes are completed, coordinating SOF and CSAR forces (from ACC), standardizing training across the commands, providing more exposure to multiple players, promoting higher situation awareness, fostering better CRM and crew interactions in general, improving multiservice interactions (e.g., Army/Air Force), and supporting additional coordination training to deal with inevitable problems concerning radios in which "being able to talk to someone (other than the instructor inputs) really helps coordination."

Finally, the remainder of the positive responses (11) fall under the category of miscellaneous positive benefits. These run the gamut from such gains as incorporating aspects of real-world missions by hearing and seeing others to task saturating the crews, learning to work in a high-stress environment, "seeing how one's decision affects others," promoting improved methods of task prioritization, improving the intensity and realism of training, testing new tactics, giving new crewmembers a feel for how "missions should run," helping inexperienced crewmembers experience the high pressures of adapting to mission changes, capturing lessons learned, and allowing "human error to enter the model."

Additional Comments

Participant responses to the Additional Comments segment of the survey were mixed. Of 48 responses to this question, 21 could be classified as "positive," 19 as "basically negative," and 8 as "constructively negative." Considering first the positive responses, participants cited the following specific features of networked training most often: role playing by dynamic aggressor, integration of threats into training, opportunities for ARs with other simulators, and coordination with other aircraft. The remainder of the positive comments tended to be nonspecific, as typified by comments such as "very good simulation," "thanks for helping me improve," and "overall not bad." Perhaps the most typical reaction of this segment of the survey participants are such statements as "Good but still has some technical glitches" and: "Good training. It needs to be refined somewhat. But it is an excellent start. And someone has to lead the way."

Comments were classified as "constructively negative" if the participant failed to identify anything positive about the networked training but at least pointed out areas where improvements might be made. The most likely areas for improvement included the navigation logs, flight charts and other planning materials; upgrading the cockpit and engine of the MH-60G WST to line unit standards; and changing the location of the infil.

Finally, negative comments encompassed a wide range of topics. In some cases, the comments were fairly general, such as "the mission did not challenge my duty position" or the "A/R is unrealistic and worthless." For the most part, though, negative comments were aimed at specific aspects of the networked simulation. Among SOFNET's most critiqued features, some participants wanted: more challenging missions (e.g., dual drop or static line drop to infil a team), more extensive training on SOFPARS, more EP training and "fewer MOST missions," more integration of the MH-60G FE into the SOFNET team, better maps, more time for mission planning, more involvement of the MC-130P CS in the scenario," equal radio volumes across WSTs, and to have onboard AGSs to help the task-saturated helo pilots.

CONCLUSIONS AND RECOMMENDATIONS

Discussion

Despite the high ratings we reported, our observations of the SOFNET training sessions highlighted a number of problems. Presently, SOFNET mission training practice is not focused on any set of tangible training objectives, nor is it geared to take full advantage of the strengths of the training methodology. SOFNET training also requires a great amount of time to develop and conduct (the training day is often greater than 10 hours). This time might be better used elsewhere in either the ART or mission qualification (MQ) curriculum. Along this line, the full-day experience of SOFNET training precludes an opportunity to provide further focused training on, for example, aircraft systems and emergency procedures.

Next, the SOFNET scenario is currently scripted in an unclassified database using a fictitious country setting with made-up names. Little perceived value exists for ART purposes to promote simulated mission operations in an artificial manner. Using fictional names simply makes the scenario more difficult to remember, or relate to any personally held "mental model" of the world. Conversely, crewmembers report a preference for conducting complex mission operations in real-world, "hot-spot" locations in which they are familiar. A simulated mission scenario requiring such manner of operations would promote an enhanced credibility that adds to the fidelity of the networked training. Moreover, such a strategy could encourage training participants to accept their mission tasking with appropriate seriousness and involved thought.

Additionally, the ability to encounter threats and apply tactics in a real-time, networked environment is a simulation training advantage that cannot be replicated in the aircraft. It has, however, been reported that the mission script should include a greater threat-saturation level for all network players. The threat-modeling capabilities of the network simulation are a significant advantage over standalone training because live threat encounters require crewmembers to think and act in real time to the unknown attributes of combat adversaries--a characteristic that can only be <u>partially</u> replicated by the use of a moving model system.

Finally, certain SOFNET system characteristics also exist (e.g., threat parameter manipulation while in networked mode) that make it difficult for simulator instructors to instruct. We would provide information to help ascertain where the training system "roadblocks" are, and how these might be effectively dealt with to improve overall training. Finally, it was reported that the present SOFNET mission scenario is "fun," but is only challenging for pilot crewmembers. Non-pilot crewmembers are not receiving effective training, and are often only "along for the ride."

Implications of the SOFNET Training Method

We have established that the SOFNET training method is an effective means for mission crews to train for joint operations coordination and procedures. Certain changes are necessary, however, before the full benefit can begin to be realized. For example, the mission training scenario should be restructured to include a greater amount of systems and emergency procedures training. To that end, we propose that a greater emphasis on the development of training objectives and focused strategies be provided.

Additionally, crewmember participation roles should also be equalized across WSTs, such that all participants are involved and tasked to perform at similar training levels. The actual time spent in the simulators performing the mission scenario should be shortened. It is counter-productive to prepare crewmembers to perform, for example, in the threat environment, and then task them to fly for two hours in the simulator before anything interesting happens. Tied to this point is a great need for more face-to-face time between mission crews as they plan and prepare for their joint mission operation. It is proposed that the actual time cut out from the simulator period would be better utilized by providing a longer and more focused (team) mission preparation session.

The ultimate benefit to continuing sponsorship of the SOFNET training method is to put the 58 SOW "out in front" with regard to the implementation of advanced networked training protocols. The 58th owns a one-of-a-kind training capability, that with relatively minor adjustment, can become the model for the establishment of advanced Distributed Mission Training (DMT) foundations and principles. This training has the potential to not only significantly improve the combat mission readiness of the warfighter, but to also increase the effectiveness of joint combat mission operations.

Implications for Further Research

We propose a continuation and expansion of the present lines of our SOFNET evaluation using our questionnaire, and session observations. Data collected from such further research would provide prescriptive guidelines and recommendations which could enable a greater understanding of effective team coordination and mission performance. The results of such an investigation would also produce data for CMT instructors and training developers to identify what constitutes skill in aircrew team performance protocols and procedures, thereby supporting feedback and reinforcement procedures. Training interventions could then be developed to improve aircrew coordination in task-specific situations where a high level of interdependency is required between members due to unpredictable or highly complex missions.

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APPENDIX A

SOFNET SURVEY

The Armstrong Laboratory Aircrew Training Research Division (now known as the Air Force Research Laboratory, Warfighter Training Research Division) has been sponsored by the 58th TRSS to collect certain information on research issues in network simulation. Your participation is greatly appreciated, and responses will be treated with full confidentiality.

PART I. Please complete the following crewmember background survey.

Rank/Name ______________________ Aircraft ______________________

Crew Position ______________________ Squadron ______________________

Flight experience (approx. hours) ______________ Simulator experience prior to this week? YES / NO

PART II. Based on today's experience with the network mission, please answer the following questions.

1. How clear was your specific role as a network player in the mission script once the in-brief ended? What might have been done during the in-briefing to help clarify your role or requirements?

2. Were there aspects of the mission script that required you to support the actions of another crew that were artificial or unrealistic? Please explain.

3. In what ways did your mission plan change as a result of interaction with other mission team players? What team interactions were helpful or not helpful? What other team interactions would have made the training more realistic?

4. How is training in a joint networked simulation mode likely to affect your real-world chances for mission success? Which areas of the mission are most likely to be affected? Please explain.

5. Additional Comments?

PART III. Please rate the value of networked simulation relative to standalone simulation for training the following mission elements.

1	2	3	4	5	NA
Unacceptable	Less value than standalone	Same value as standalone	Better value than standalone	Networking is essential for this element	Not applicable or not performed

Mission Element	Rating	Comments
1. Mission Planning	1 2 3 4 5 NA	
2. Tactics Planning	1 2 3 4 5 NA	
3. Mission Briefing	1 2 3 4 5 NA	
4. Low-Level Planning	1 2 3 4 5 NA	
5. Night Operations	1 2 3 4 5 NA	
6. Low-Altitude Operations	1 2 3 4 5 NA	
7. Radar/FLIR Interpretation	1 2 3 4 5 NA	
8. Secure Communications	1 2 3 4 5 NA	
9. Multiship Tactics	1 2 3 4 5 NA	
10. Threat ID & Response	1 2 3 4 5 NA	
11. CSAR Operations	1 2 3 4 5 NA	
12. Airdrop Operations	1 2 3 4 5 NA	
13. Weapons Employment	1 2 3 4 5 NA	
14. Transload Operations	1 2 3 4 5 NA	
15. Air Refueling Operations	1 2 3 4 5 NA	
16. Terrain Familiarization	1 2 3 4 5 NA	
17. Formation Flight	1 2 3 4 5 NA	
18. In-Flight Problem Solving	1 2 3 4 5 NA	
19. Threat Avoidance/Evasion	1 2 3 4 5 NA	
20. Checklist Procedures	1 2 3 4 5 NA	
21. Systems Malfunctions	1 2 3 4 5 NA	
22. Crew Coordination	1 2 3 4 5 NA	
23. Situation Awareness	1 2 3 4 5 NA	
24. Time Management	1 2 3 4 5 NA	
25. Command & Control	1 2 3 4 5 NA	
26. Minimum WX Operations	1 2 3 4 5 NA	
27. Mission Diverts	1 2 3 4 5 NA	
28. Infil/Exfil Operations	1 2 3 4 5 NA	
29. Fuel Management	1 2 3 4 5 NA	
30. Chaff/Flare Management	1 2 3 4 5 NA	
31. Mission Debriefing	1 2 3 4 5 NA	
32. Mission Team Coordination	1 2 3 4 5 NA	
33. Overall Value	**1 2 3 4**	

APPENDIX B

SOFNET Comment Data

Crew/ Pos.	Question 1: How clear was your specific role as a network player in the mission script once the in-brief ended? What might have been done during the in-briefing to help clarify your role or requirements?	Question 2: Where there aspects of the mission script that required you to support the actions of another crew that were artificial or unrealistic?	Question 3: In what ways did your mission plan change as a result of interaction with other mission team players? What team interactions were helpful or not helpful? What other team interactions would have made the training more realistic?	Question 4: How is training in a joint networked simulation mode likely to affect your real-world chances for mission success? Which areas of the mission are most likely to be affected? Please explain.	Additional Comments
I 130P	No h-hour established. Other than that, fine.	No	Realistic change when helo went single engine. Perhaps more enroute threats would enhance scenario.	Coordination required is excellent, but I am not sure we need networking to accomplish that.	At this point in time and training, the experience level of the crew force I think that a MOST and networked mission may be less productive than 3 system refreshers and a MOST/ networked scenario.
I 130P	Clear except for no times for Hit, ARCT, etc.	No	Changed to single engine helo AR	Can practice procedures, i.e., single engine, helo AR that aren't seen everyday	
I 130N	No problems with one exception. There was not a "hit" time given, which was needed to figure the flight plan and determine T/O time.	No	Not at all; air refueling coordination	Yes, affected areas would be the "weak" links, such as communication, bump plans, etc.	For MC-130P, this was a standard training mission. For a simulator mission, we need more challenges. Maybe a RAM/personnel airdrop, or dual drop, or static line drop to infil a team. Also, at least one threat engagement is recommended
I 130N	Our specific role was clear except we had no hit time or ARCT.	No	Different AR configuration. It was helpful to have to deal with the change.	Mission rehearsal is a big plus! Dealing with additional changes, inputs, and errors helps with real-world missions.	We really didn't have much to do and was not task intensive.
I 130FE	N/A	No	N/A	Good practice for real-world, also helps to see how EPs affect the mission	
I 130CS	N/A	Some artificial using UHF for command net	N/A	Get together after routes are completed	
I 53P	No problem with what we were going to do	No	We would have probably stayed near the island and had the ship come to us since we were single engine. We could have established an AR track near the island. Would have been a good idea. Wish I had thought about it.	Adds realism in that more human interaction is involved. However, the physical act of AR in the simulator is probably 3 times harder than it is in real life.	Enemy aircraft and threats are of great value for simulator training. Need to try and improve integration of these aspects.
I 53P		No			

1 53FE	Clear, less history and more on mission tasking	No	A/R, having to A/R to give the 130 crews training. A wing man.	Good, insertion and the outbound leg. Things like a spare, good refueling prior to or just after insertion. Better intel!! It's training, but in the real world, we will receive better intel. To try this in the real world, it would not happen. Sure it's the sim but you tell us to play it as real. I would expect it from this also.	
1 53FE	OK	No	Normal Ops	Chance to try life and death scenarios is always great!	
2 53P	Clear, but it would help if the course were long enough to allow the crews to do more mission planning before each sim.	No	We had to learn to think about the different aircraft capabilities and adjust our actions accordingly, i.e.., different airspeed, acceleration/decel rates and different defensive systems	It helps by simulating threat and emergency problems necessitating bump plans and flexibility	
2 53P	Knew I was to fly helo formation and work with a tanker. More detailed "role players," filling in voids that the sim has. i.e., give us the aft 180° perspective in words.	Unrealistic planning time, we had to plan today's, then tomorrow, then come back into today's role. All in 2 hours.	Slipped TOTs/AR made everyone jump thru their ass, as it would be in a real-world scenario. Team intercom was audible on intercom, sort of gave away what was going on	Greatly, anything that forces decisions that are unexpected, helps younger/inexperienced crewmembers to feel the high pressure of real-world changes and makes them adapt	
2 53FE	Good brief, impression was this is a standard SOF mission. Just like I've been flying for years.	No	Were required to adjust due to MH-60G dropping out. Even though this was a technical glitch, it was a realistic scenario.	It's realistic in the many different situations that occur due to dissimilar aircraft integration.	Pave Low FEs need extensive training on SOFPARS. Currently engineers in the field have very little experience with SOFPARS. This is required due to Pave FE's pivotal role onboard the Pave Low
2 53FE	It was not as clear as normal missions due to lack of time to examine and question the plan.	No	Prior time available to interact with the H-60 crew limited our ability to resolve any terminology differences. The amount of training conducted today was good overall.	It will greatly reduce the amount of re-planning done due to a lack of knowledge of incorrect information about other platform's capabilities or restrictions.	
2 60P	Was good - comm package weak.	We were fragged to put a team on a bldg, but wasn't room for both helos there. I would not have been able to do the mission of putting both teams in at the same time. Crewmembers could hear admin traffic between Ips.	Interaction was good. We learned some of the limitations of the Pave Low.	Training will definitively improve success potential. I focused myself continually thinking in the combat mission mode. Result would be high situation awareness and fewer mistakes. Areas to be affected would be objective, run-in, and the egress as well as comm issues.	
2 60P	The role was specific. However, I am a rescue pilot and this is not one of my missions. I did enjoy the opportunity to do a SOF mission but I needed more training to effectively integrate (terminology, tactics, etc.).	We would not have executed this mission with 700 engines. The power limitations were excessive. We could not even AR.	The interaction with ABCCC was good. I think there would have been more comm with a real ABCCC. We needed interflight, P's/threat call freq, and package freq.	I think it would help. C2 would probably be greatly affected. It helps all the players integrate which helps because real time we would never get all these players together.	

2 60FE	Better mission planning cells.	None	None	The planning and interaction with SOF/rescue forces needs to happen. It is probably not in any O-plan but it may just happen in a war. History repeats.	
2 130P	ATO/SPINS did not include enough supporting materials for back end crewmembers (CSO) to plan EPA.	Planned orbits. No supporting player calls that affect our (MC-130P) decision making realism. Unrealistic mission role--why not use MC-130P for transload?	Mission was affected by early T/O of helos. Had to compress flight plan and checklists adding a realistic amount of "stress" not normally encountered single ship.	Probably good for a very young crew. This scenario was too much like JRTs to change my performance significantly.	Too much emphasis on tactics. During sim refresher, 2 tactical sims too much. Leave SOFNET mission in, change MOST mission or at least eliminate second mission planning session.
2 130P	No problem with our roles.	Yes! 1) Shadow A/C was to depart early and orbit on the AR track that was covered by enemy EW radar prior to helo/ tanker ingress. 2) Our DZ (Pueblo) had an enemy threat on the field. We wouldn't go there. 3) The transload/ FAARP/DZ at Pueblo was un-realistic partly as a result of #2. Also, it seemed ridiculous for us to insert a team to secure a field for FAARP/transload. The helos didn't even require the first AR.	Helos departed early without notifying us. Our ARCT was predicated on their take off time. Hence, we were late for the CT before we even departed.	This is immensely valuable training that exposes us to the "fog of war." I think it would be good training to have a mission with no programmed malfunctions because the malfunctions create an air of uncertainty due to the role playing required.	On the other hand, aside from the threats and malfunctions, this scenario is what we do at the schoolhouse and out in the field go on for every TAC flight. I would not use the SOFNET to replace normal annual simulator requirements. The sortie today was immensely valuable, but we lost other important training, hydraulics refresher, pneumatics systems, TOLD data, etc. because of the SOFNET sortie. We can't make it up.
2 130FE		No	I think the team interactions make the simulation realistic.	Networked simulation mode would make your real-world chance for mission success an increased possibility. The simu-lation mode network gives you the ability to operate anywhere on the earth.	
2 130CS		N/A	Other team interactions would have helped and made the mission more realistic by using additional agencies such as a SOCCQ, AWACS, CP, etc. Otherwise, good communications.	Networking incorporates good aspects of real-world missions by hearing and seeing others.	
3 60P	If I were tasked as printed in the mission packet, would think that the planners had no idea of the capabil-ities of the H-60. May-be it's there to make us crewmembers change the plan, I don't know.	No	With the current plan, the H-60 could only recover the team it carried in plus 1 person. So the 53 was required to take up this role. I felt we interacted well with an overview, crew brief, return for study, then get together for final questions.	I feel it can enhance the need to under-stand each other's limitations/capabil-ities. Sometimes say same things in a different language.	
3 60P	Good	Performance required from 60s with 700 engines was unrealistic. Mission require-ments didn't match aircraft abilities.	Tactics employed to evade enemy aircraft, weapons was more dynamic with networked simulation. Required consideration of 2nd aircraft.	Brings about problems incurred when flying with dissimilar aircraft that is not normally experienced in a like aircraft mission.	

3 60FE	Clear, mostly. However, without the AGSS, the FE role was significantly limited.	1) The scenario needs work. The conditions for weight, temp, DA made it impossible given aircraft performance capabilities. 2) Without AGSS capabilities, dog-fighting with the HIND was unrealistic. Cannot scan 360° like we would be able to in real life. 3) We are a rescue crew. This was a SOF mission. We don't normally fly with H53s. OK for familiarization, but otherwise unrealistic.	Tanker fuel offload was real slow. Otherwise, my comm on left observer's ICS cord carried only ICS transmissions. I could not hear any radio transmissions, significantly limiting my situation awareness, and effectiveness in crew participation/interaction very restricted.	I'm not sure. We would not normally fly with H-53s.	
3 60FE	Pretty clear, but was updating the clarity throughout the day.	No		The joint network is very much needed. We don't train the same--this will bring us closer.	FEs on H-60 sim have to work real hard to be a part of training. Not a lot of value, our pilots are used to us being part of the team.
3 53P	There were some holes. 1) An IMOM product with threats degraded like you would see at a JSOTF. 2) If preplanned, an LZ with correct coordinates. 3) More terminal ops data (e.g., imagery, etc.)	Yes, mission plan for 60s seemed to use new engine data (701s) for TOLD--even though the 60 sim uses old 700 engines. As a result, we had to take more weight which made our power margins closer.	Took on weight (see #2) - More time between crew prior to flight. Watch mixing and matching Special Ops and rescue crews with as little prep time. Our paradigms are different (SOPs, etc.). Interoperability is hampered with such little time.	Good overall mission - not too tasking, but keeps you constantly busy! Work out the bugs and this scenario will be great.	
3 53P	More time to review package and do deliberate planning. No AMC identified.	Yes; rules/procedures between aircraft and commands are needing combination to ensure that the crews identify what's different.	More of a ground team sheet for scripting, i.e., ROE, team brief, and assault plan.	With real threats and data (target) bases loaded, it is a great mission rehearsal tool.	
3 53FE	Pretty clear, more detail in the inbrief would have been nice (ROE).	Interaction between crews improves the whole sim profile.	Little change in the mission but all the interaction depends on the other crews. AFSOC has different training and tactics than rescue crews.	Learning to work with other crews in stressed situations is great. Sometimes one crew gets focused on one thing and another realizes things that the forward crew would not. It is too bad we only have one J sim!	365-4 Form 4 in detail for each airplane would be great.
4 130P	Specific tasking was provided.	Yes, simulators (MC-130P, 53, 60) did not have an airspeed comparison that matches that of the aircraft. I had to fly too slow for the helo during AR.	Had to adjust TOTs based on completing AR late. ABCCC interaction was helpful.	In-flight comms and mission changes (bump plans) are the two areas most likely to be affected. SOFNET gives us the opportunity to practice these real time.	
4 130P	Very clear. Good materials to develop mission concept.	No	Except for a few software glitches (AR), the interaction was realistic.	This is exactly the type of mission we would expect to encounter and these were the types of problems I would expect.	

4 130Nav	Our role was very specific	No	For more realistic training, have SAM threats closer to flight routes. Be able to determine if crew survives or not based on tactics and countermeasures. Inability to offload fuel to helos caused delay in H-hour. Late T/O by Shadow A/C caused delay to contact time. Shadow stayed with helos as long as possible to provide fuel. Future possibility--challenge teams to refuel in nonper-missive environment. Engage with threats to see how crews would react to survive! together (real-world tactic question).	Communication is key. Joint networking just reaffirms already mandatory comm channels that must be used in real-world channels.	The Shadow A/C was given one crucial task (time critical) to refuel the helos. The second task, airdropping team, was not as time critical. Adjusting plan because of helo refuel delay seemed easy—just call up and change H-hour. That might not be possible in a real scenario.
4 130Nav	Very good. Put the players in the mindset. Role call/aircraft commanders may even consider assigning the inbrief to a mission commander (MH-53, MH-60, MC-130P). Have the 3 MCs meet the day prior for 30 minutes or 1 hour.	No. Very realistic script. Tasking was definitive and representative of what the gunners are training to accomplish.	Mission plan was straightforward with a defined task. Changes were minimal. It was nice having the interaction because of the real-time emphasis placed on planning. Formation brief should have involved all assets to include role call.	The what-iffing provides a sense of realism. Again, the formation pre-brief is a must for all players. This experience as well as that of real-time communications provides sound experience for crewmembers.	
4 130RO	Clear as could be.	The airdrop and transload may not have been needed. Possibly you could compromise the DZ with the barlock forcing another AR and no transload.	I was happy with the interactions.	The comm glitch was realistic. I've never seen comm go well and relaying through ABCCC and not being able to talk to the helos was true to form.	
4 53P	Role was clear. Mission scenarios/ planning can be improved with a FRAG sheet that puts all the appropriate data on the kneeboard.	Original temperature and weight was unrealistic. Normally would have more than one PAVE LOW to do the mission. The 60G was unable to carry any of the PCs out.		Increased mission success through practice interaction. We never get that unless at a JCET/JRX. It is absolutely key to our success. The mission area most likely to be affected is C3.	
4 53P	Very clear.	Yes. We never really fly with the H-60s. It is hard to fly with someone when you don't know their capabilities.	Plan together in one place.	Shows you how much your decisions affect other people.	
4 53FE	Very clear.	No	No ways	Not likely to affect my role personally as an FE.	
4 53FE	N/A	The way the plan was, the 53 could not have done the mission, i.e., fast rope at 4300 lbs at 29°C and 720'. If you want us to think, try to be a little closer to a way to do it (like dropping the temp from 29°C to 3°C and so on.	N/A		Overall, not bad. Great job.

4 60P	A little better discussion on LZ intentions. We had to create some of our own assumptions after the briefing.	Realistic. There is excellent learning involved in studying the mission scripts.	Final LZ anticipations. A little more mission planning time would have been helpful.	This is great stuff! All missions involve multiple players. The more exposure, the better. Work out the technical problems and you'll have a great product.	The maps need to have a different format. The time tick marks should count down to the next LZ not up from the previous LZ.
4 60P	Very clear. The scenario was very realistic and comprehensive.	No	Not used to flying with an H-53 (sight picture is a lot different). I feel that not having a viable left and right scanner puts a lot of emphasis on the scanning of the pilot and CP (increases workload when they are already extremely busy).	Makes you think about things unique to dissimilar formation (rotor clearance, power requirements, LZ requirements).	Get a way for left and right scanner to be part of the crew more on TAC missions.
4 60FE	My specific job was clear but extremely limited compared to actual aircraft. With the gunner simulator, this would be greatly improved. That said, I think there is a need for a 60-specific gunnery simulator. By that, I mean one in the 53 bay and one in the 60 bay.	Directing the HIND engagement when the scanner on both aircraft would have picked it up early on.		With the software/database bugs worked out, this would greatly enhance coordination between crews.	
5 130P	Fairly clear. As with any preplanning, more time and detail can be done. But we're limited for sim refresher.	Problems with visual software made us simulate some aspects of the mission.	Had an unplanned AR. Very helpful in making us coordinate with the helos. Other team interactions perhaps would be some RESCORT or RESCAP players.	This is the premier tool for mission pre-planning.	Very impressive system.
5 130P	Role was clear and well understood. No suggestions.	The airdrop in hostile territory was unrealistic for our aircraft/ tactics. However, it was lots of fun (given the briefed threat scenario).	The networking with the helos provided us with the chance to perform an unplanned AR. This was great training and could not have been done without networking.	Success is enhanced by practicing all the what-ifs prior to doing a real-world mission.	Great system and lots of fun. The only problems were software (aircraft disappearing, etc.). I would like to do it again.
5 130Nav	Very clear	No	A briefing more along the lines of "Red Flag" might be better, i.e., a face to face prior to the mass briefing.	Networking is definitely an improvement in realism and intensity of training.	An excellent start for a nascent system - keep up with the new ideas.
5 130FE	Very clear – acceptable.	No – acceptable to very good. Better than some real world, worse than others.	Always changes (real or not). Not a valid question for me.	This is great if all the small bugs are worked out. Very realistic, but visual problems need to be adjusted. HC-130P AR was unrealistic from tanker perspective. Did not appear or "feel" as if helo was taking fuel - had to "simulate" fuel offload.	Thanks - great "MOST" training.
5 130RO	Done more face to face with other players or liaisons for the appropriate players.	Unrealistic. Our unit will not penetrate a high threat area. If we practice for real world, then we should execute real-world scenarios. I've been told not to train outside what is real for then we might in real world be tasked outside our doctrine		Give you ideas on how it would work. The areas in which you are weak and strong in, and through lessons learned, be able to correct so that a real-world situation can flow more effective, and you know what you need to look for and maybe do it better.	

5 60P	We had all the information we needed. Nothing.	Yes, visuals + WST problems caused us to make changes. The lack of full visuals made our left and right scanners useless. Unrealistic.		Increase it. Comm planning.	
5 60P	Role was relatively clear. However, specific plans of action and mission preparation (i.e., map study) could have been added to in-brief to enhance mission success.	No	The mission plan was essentially a special operations profile which, while a good learning opportunity for all CSAR crews, required the ACC crews to perform the mission to different standards.	The networked simulation is extremely useful in allowing crews of various airframes to train in a realistic environment and allow them to test tactics and procedures that will ,in the long run, enhance mission effectiveness.	
5 60FE	Very clear. Nothing.	No	There were several times that we became lad due to poor map planning. Also there were several instances of poor communication due to different standard terminology.	Communication between joint commands and different ways of operating.	
5 60FE	To have the mission scenario sooner so that better flight planning could be done	Not that I was aware of.	We had an unplanned AR. The tanker was very helpful with their interaction. By providing us with ample support and interface throughout the entire mission.	This was a very realistic scenario. Being part of several JCS exercises and deployments myself, I can say that the more often you rehearse this scenario or others that may be planned, you will probably increase your mission success rate about 70-75% (real world). Comms will most likely to be affected.	
5 53P	Brief crews that more route prestudy is required.	AR is only marginally realistic.	Unplanned AR--good mission changes for both crews.		We could have used the whole a.m. to plan and study the mission. At least 3 hours of preplanning needed.
5 53P	Clearly understood my role.	No	Plan changed due to late T/O but interacting with other team helped recover from potential problem.	I think it will impose real-world constraints. Working in networked mode helps expose other player's limitations.	Even with occasional minor glitches, it is still an outstanding system.
5 53FE	My role was clear. Better charts should have been made available.	No	It really didn't. Changes were caused by both internal and external factors, but not by other teams.	It should enhance our real-world capabilities. The areas most likely affected will be communication and team limitations.	This could be the best training conducted all week, but more planning needs to be done. The mission should be given to the crew at least one day prior. The crew needs to study the mission more. The SOFPARS charts are inadequate. The NAV logs are inadequate. Other than some adjustments this is great stuff.
5 53FE	Very clear. Role was very realistic. Reminds me of a related exercise.	No. Very good and well thought out script. The only limitation may be the number of available sims. This mission would probably use 2 53s and 1 60.	Needed more interaction between aircrews during planning. This is a limitation when "simulating" other aircraft instead of networking.	Positive effect! Realize the impact and "fog of war" occurs for other crews.	

6 53P	Clear for the amount of mission planning. The info was just about right.	Some SA-2 indications were bogus. The HIND at night (3rd world limited night capability) was somewhat unrealistic.	It was good to brief with the 60 crew. However, different procedures, i.e., formation lights, comm-out procedures, etc., should be standardized or at least briefed.	Use real database's terrain. Could have used an overall CAP/SEAD package for certain parts of mission.	Need an AFSOC/AETC/ACC working group to work out standardized procedures for these types of operations.
6 53P	Very specific roles for 53, 60, and 130.	Yes, secure FM radio for team exfil and call for fire support is not the standard. Should be in plain mode for quick, clear, concise comms	Didn't change much, 53 and 60 worked well supporting each other as mission progressed. Didn't FAARP and leave due to damage to helo, planned to destroy aircraft.	Very good joint training and interaction with other airframes. Increase chances when we don't get much chance to work with different command (ACC) helos.	
6 53FE		The team should be nonsecure during their operations and to use the PRC-112 as a backup or to use this radio to call in for helo support and pick-up.	Better interface with some of the other helo assets.	Greater knowledge of what and how all other players interface. How the bump plan works.	
6 53FE	Not much. Nothing	No	None. Mission planning, more mission plan.	Better. All, for the fact that you get a little better interaction.	Overall, good training, but a few technical glitches.
6 60P	Very clear.	H-53 position lights were on during entire mission even though H-53 crew turned switches off. Use a real-world database. Unrealistic aircraft parameters (engines, cockpit).	None.	Crew coordination, trains the new copilots in task saturation and how to prioritize their tasks.	Get the H-60 upgraded to line unit standards (engines and cockpit). Get a better FLIR screen which responds correctly to force controller. Get a scramble launch rescue mission with fighter escort mission. Lots of comm jam and going into a hot area with a downed pilot. Get crews together and hash out MAJCOM differences before mission.
6 60P	Very clear.	No		Mission success increases because network simulation shows the differences between how the different airframes operate and function (comm procedures, emcon, etc.) (53 vs 60).	The maps were pathetic. Couldn't see the Lat/Longs on the map. Who uses a map in a 3-ring binder? Route was hard to follow due to the symbols or the lack there of. Recommend the use of real maps, not computer-generated. Also, the crew should make them, which provides them the opportunity for route/map survey familiarization.
6 60FE	In-brief was good.	No			The simulator does not challenge 60 FEs! There is nothing for them to do or they are not tasked properly.
7 130P	Very clear except would have liked to see an ATO. Mission needs more input from intel, MC, and ATO.	A/R with helos seemed realistic. Window view is an issue/no loadmaster.	Not a factor today.	Need real-world scenarios, Intel, planning. Need better realism (i.e., threat analysis was not very realistic). No intel input, etc. Mission brief back to CCs, etc.	Good program! Do in formal school.

7 130P	Very clear. Everything was spelled out for us.	Offload of gas to the helo.	1) No change--that's our TOB. 2) All helpful. 3) None noted	Greatly enhances.	
7 130Nav	Very clear.	No, today every time worked as planned.	No mission change. Did not notice any interaction that was helpful or not compared to a standalone simulation.	If we use real-world terrain data and threats, it will be very useful to a real-world mission.	
7 130Nav	Very clear. Maybe incorporate an ATO.	None.	The mission changed a little due to a hung hose after A/R. It was helpful because it made us look at different options that affect the follow-on airdrop.	Very helpful in dealing with real-time malfunctions that affect refueling and whatever follow-on missions (i.e., airdrop, infil/exfil).	Very good simulation.
7 130FE	A. Very clear B. Unknown	No	A. It did not. B. None C. The helo AR--don't give up if he can't refuel. Suffer the consequences.	A. See possible problems here--not out in the "desert." B. Actual execution C. See above.	Good, but still has some technical glitches.
7 130RO	Very clear. The scenario pretty much outlined in detail our objectives.	Not really.	Overall, nothing affected the way that I would operate in a real or simulated mission.	It would be useful to first time crew-members, those going through initial training, to give them a feel of how a mission might run. Communications play a more important role in any mission, real or simulated, than what we receive here.	Get the RO more involved in the scenario.
7 53P	A. None. B. Very clear.	None	The aggressor was a new and added twist. Ground fire needs to be visual to the front end.	This training allows "human error" to enter the model you are trying to work with.	This type of training is well within the scope of Refresher.
7 53P	It was clear as to the intent of the training mission. Go through a full-mission brief and have preplanned ARCT and other missions.	No	The interactions are good. It increases the number of unknowns. It keeps the unknowns more realistic, not artificially put in by an instructor. A/R seems much more stable than models put in by instructor.	I feel it will increase. It certainly will not hurt.	Good training. It needs to be refined somewhat. But it is an excellent start. And someone has to lead the way.
7 53FE	The specific roles were explained very well.	We had to simulate the calls of our scanners. Once the gunner sim is online, this should be fixed.	No changes.	I think the best use of networked simulation is in the command and control area. Bring commanders who will be AMCs. Could use the training to help in decision making and managing stress.	
7 53FE	It was clear what was going on.	No	The mission didn't change due to team players.	It helps as far as CRM because of everything going on with the radios and malfunctions. Maybe to make it more "real world," the crews should be recalled and launched immediately after the brief in the TOC.	
7 53AP	My role as an aggressor was clear.	Not to my knowledge.	No changes.	I think that this type of training is of great benefit.	Real-world scenarios would aid in creating a more realistic mind set.

7 53AP	Very clear and specific.	No		I believe this type of scenario is very helpful to prepare for real-world missions and increase chances for success.	Role-played part of aggressor. Myself and another pilot just past contact check ride & were placed in the aggressor role. It was of some benefit to us to think like the "bad guy" and will help us prepare for the tactical environment. Further, it was instructive to see the "big picture" and how real-world missions will be planned.
8 130P	Very clear.	On the contrary. I think including random helo AR requests was very typical for our missions.	See above—Random AR is a reality for us. Tanker (KC-135 or KC-10) support.	Live real-time changes to AR tracks and offloads train for real-world scenarios. Bad Ex or marginal Wx on track would force tankers to search for alt track vs altitudes.	Getting IFR capability would allow us to exercise real-world changes to the plan. Especially when slips occur due to complications.
8 130P	It was very clear.	No, actually it was very realistic because we actually got to add an AR which happens a lot in exercises.	It didn't really affect anything.	I think it will improve real-world chances. Things aren't so canned such as an opportune AR. Helos not exactly on track or late or coming in a different angle, etc.	I thought it went really well and I enjoyed it more and it was more realistic than standalone.
8 130Nav	Understood my role perfectly.	N/A	Pop-up Air Refueling	Very realistic with the pop-up A/R. This happens on almost all exercises. Very valuable training for realism.	
8 130Nav	During the in-brief, our mission was clear. Explanation of mission tasking was clear.	Negative.	The face to face allowed for a clearer picture of the Mx. We compared IP, CP, Ex coordinates and MSAs. All interactions were helpful. No other interaction seemed necessary.	The thing we were looking most forward to were seeing actual threats and 69 indications. They did not work on this particular day. But in the future, the threat portion of the Mx will be the most valuable.	I thought the sim was great. The amount of time the helos needed for gas was a little excessive. It took approximately 10-12 min for a 1500# off-load. The opportunity A/R was excellent at the end of the mission. It was realistic—just like a JRX.
8 130FE	Plenty of information for this mission in my position.	Pretty good. Felt realistic and wasn't so focused that it was a simulator.	Helo had a crewmember pick up after aircraft member egress. They needed more gas before landing. SOP--no problem.	Communications are never this good in real world. Good training as an initial multitask, multiforce exercise.	Communications is the key.
8 130RO	Very clear.	No	Added A/R is more real world--last minute stuff.	When things happen to helos and they need us for last minute A/R--that is great for us. We need more practice with that--I think anyway. It only makes us better.	The RO in my opinion doesn't really feel a part of things being up in that room alone and not being able to see anything that goes on.
8 60P	Very. Nothing.	No	Had to P/U Hind crew that ???	Having just come from SOF (55 SOS), I did nothing I haven't been doing for years so I don't feel I gained anything from it. For rescue crews that don't fly dissimilar formation or multiship combined SOF-type missions, I think they get a lot out of it.	1. Weird A/R graphics (offset superimposed imagery). 2. Need ability for FE and AG to "see" to the side and aft to better keep SA for all. 3. Dissimilar radio volume from players greater than real world (need to equalize). 4. Threats don't seem to come up well on RWR.

8 60P	Clear.	DA and temp @ site required us to pawn off part of our load to the 53 due to our 700 engines.	Had to pick up HIND crew. Good diversion.	Increase. Such interactions build my capability in comm and being flexible.	1. Suggest Thursday day sim then Friday do a night sim. 2. If sims are incorporated with fighters and AWACS, then use Friday as the mass sim day.
8 60FE	Good and specific. Knew exactly what was expected.	No	We had to pick up the Hind crew. They vectored us in.	To me, it was no different than doing a live joint exercise except that everything looks better live.	
8 53P	Clear, considering the purpose of the mission.	Yes. Flying with rescue birds for a team infil is unrealistic.	Plan did not change.	More likely to help in the planning and coordination of the mission. Gives you the ability to work through contingencies.	
8 53P	Good briefing. More data (i.e., maps, sandbox) of the objective area.	None.	None.	It is good for coordination from within the A/C and with other agencies. It also validates route timing.	A/R is worthless, not realistic at all!
8 53FE	Clear. All aspects were covered well.	Yes, using the tracking screen, lead needed to pass info on bogie A/C to A-model sim (2), which became redundant. The wraparound screen and gunner stations should correct this.	A/R computer hickups caused us to lose C-130/FLIR and no training for approximately 5 min. Helpful--command and control/execution.	Coordination between all A/C (i.e., radios, location, unexpected delays/problems). A/R, TOTs, bump plans (i.e., personnel, equip, threats).	Overall, good flight! Through time, interaction between A/C and control center will improve. Suggest better infil location or different option for crew due to size and other AC as well as crews who have never seen it.
8 53P	Very!! Everything was clear for crew and their mission.	Yes, great detail.	A rehearsal would have made the mission better. All the systems and emergencies were realistic.	Good. I would like to see more joint interaction (Army/Navy).	
8 53P	Needed to know aircraft capabilities--scanner, gunners, rockets, etc.	No.		Networked scenario is great for the comm and big picture orchestration. Very important, very useful.	I was expecting this network stuff to be a waste of time, but it turned out being one of the better parts of the course.
8 53FE	Good--will work more for younger crews who have no joint mission experience.	Except for the fact that I have no HIND experience. I suppose the training was good for someone who hasn't been around for very long.	None (gunship).	It will depend on the mission. Could be great for real-world mission rehearsal.	Thanks for the work!
8 53FE	Clear. Nothing.	Flying as a C-force aircraft in a TH-53A sim.		It depends on the mission. Could be helpful in the mission success during real-world contingencies.	Thanks for helping me improve!
8 53FE	Very clear.	No, all aspects were fairly realistic. The free play was good to make crews think on their feet and make changes as different things occur during the mission.	No changes.	For new or inexperienced crews, this is a good way to get a taste of how joint missions can be very task saturating, especially the comm problems.	
9 130P	Very clear. Needed some MC (JSOACC) directions (i.e., 3 engine airdrop requirements).	No. (AR). No vis (computer problems) + intermittent radar with the helos, needed instructor inputs.	Changes: none. Went comm-in when rejoin did not go as planned. Good.	Good: realistic comm and mission changes (even if they don't directly affect your mission).	

9 130P	Reasonably clear.	No.	Didn't change.	More realistic practice. Skills get sharpened.	
9 130Nav	Very clear.	None.	It's always good to plan with other crews. What would have been nice is more planning time for such a threat-intensive mission.	Super idea/concept to put multiple players together and role play a mission.	
9 130Nav	Well.	No.	Combined mission is unreal. We would not do combined missions. No AR and drops.	I liked the threats. Should give more.	
9 130RO	Very clear.	None.		You gain knowledge and experience that you don't get in your normal training.	Sim flight was good. I gained a lot of knowledge in this type of sim.
9 60P	Very clear. Nothing.	Air-to-air refueling very tough. Original parameters for P/U at LZ required 98% power with 86% available. Corrected with lower temp.	ARCT moved up. HIND interfered with en route. All were good.	Good interaction. Need secure radios, HAVE-QUICK and UHF. Comm always sucks. Best to make it realistic.	
9 60P	Role seemed pretty clear.	Yes. Briefed initial conditions on takeoff were unrealistic. Our TOLD required us to have better engines (like 701Cs), less fuel on takeoff or less PAX--just so we could takeoff. Conditions were unknowingly corrected such that we had no problem taking off (temp went from briefed 16°C to 4°C).	Mission did not change. Briefing together helped clear up questions/ expectations for mission.	I would think it would improve them. The simulator does just that, it simulates—but it's better to practice in the sim on how to evade threats, as well as join on other networks than to do it for real and possibly have something go wrong. Areas could be affected: 1) being "jumped" by a HIND/fixed-wing (what will the formation do). 2) someone in the formation has an emergency/malfunction. 3) lost comm--before and after objective (what will you do).	Good Refresher. Nice to see we're able to coordinate with other aircraft and fly against/with each other.
9 60FE	Very clear.			Being able to talk to someone (other than instructor inputs) really helps coordination.	Working the infil/exfil is tough without scanners inputs.
9 53AP	I had the general idea after the in-brief.		As #3 in a 3-ship formation, our plan was predicated on load, and for this reason, our plan did not change.	Minor issues such as comm changes, waypoint info, etc. that can become major problems if not accomplished correctly are easy to identify. With this information, we can correct problems in the future.	
9 53AP				I believe that this type of training is very good at preparing for "real-world" ops.	